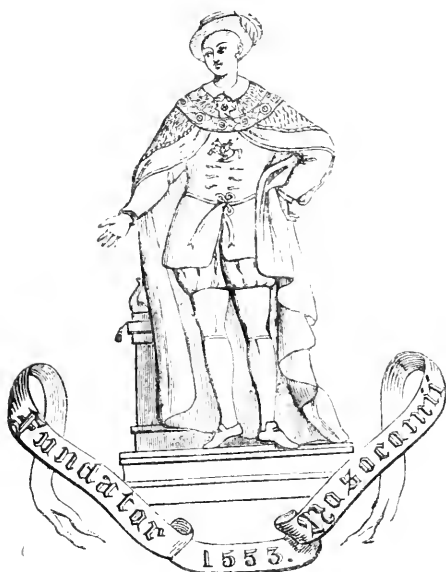


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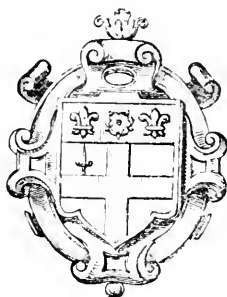
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REPORT
ON
CASES OF RHEUMATIC FEVER

TREATED BETWEEN THE SPRING OF 1868 AND THE SAME
PERIOD OF 1872.

BY THOMAS B. PEACOCK, M.D., F.R.C.P.,
SENIOR PHYSICIAN TO THE HOSPITAL.

IN 1868 I tabulated the cases of rheumatic fever which I had treated during a series of years and subjected them to analysis, more particularly in reference to the proportion of cardiac complication which they presented. This report was published in the 'Transactions' of the Clinical Society. Since that time I have notes of 87 cases of acute and subacute rheumatism, which have been under my care, of which 68 were treated in the temporary hospital at the Surrey Gardens, and 19 since the opening of the new hospital. I propose to give in this paper the conclusions to be deduced from these cases.

1st. All forms of rheumatism are much more common in men than in women, doubtless in consequence of men being much more exposed to the exciting causes of the disease. This rule especially obtains in reference to the more passive and chronic forms of rheumatism; but it is also applicable, in a high degree, to the acute and subacute affections which are ordinarily classed under the term of rheumatic fever.

Of the 87 cases now collected 52, or 59·7 per cent., were males and 35, or 40·2 per cent., females. Of the 146 cases included in

the former report the excess in males was still considerable, though less marked than in the present series, the relative number being, of males 78 and of females 68, or 53·4 and 46·5 per cent. respectively. Taking the two series of cases together, making a total of 233 cases, 130 were males, and 103 females, or in the proportions of 55·79 and 44·2 respectively.

2. Rheumatic affections occur at all ages ; but the passive and more chronic affections are particularly common in those who are advanced in life, while the acute and subacute forms are especially frequent in younger persons, and particularly in early manhood and womanhood, and are rarely seen in persons beyond middle age. Of the 87 cases the mean age of the patients is 23·8, the youngest being 11 and the oldest 45 years of age. This limitation of the disease to comparatively early and middle age is also found to apply when the cases in males and females are calculated separately. Thus the mean age of the males is 22·1 and the range of age extends from 12 to 39. The mean age of the females is 23·4, and the extremes of age 13 and 45.

In the former report the mean age of all the patients is not given ; but the youngest persons were 4, 10, and 11 years of age, the oldest 52 and 50. The influence of sex and age in the development of rheumatic fever as illustrated by the whole of the 233 cases included in the two reports is given in the following table :

At and under 20 years of age.	Total cases, 112 .	Males, 58 .	Females, 54
	48·06 p.c.	24·87 p.c.	23·17 p.c.
From 21 to 40 „	Total cases, 109 .	Males, 68 .	Females, 41
	46·78 p.c.	29·18 p.c.	17·59 p.c.
„ 41 to 53 „	Total cases, 12 .	Males, 4 .	Females, 8
	5·15 p.c.	1·75 p.c.	3·43 p.c.

The table shows, what is fully in accordance with general clinical experience, that the acute forms of rheumatism are the most common in men at the middle period of life, when, from their occupations, they are the most exposed to the exciting causes of the disease.

3. In hospital practice it is always difficult to obtain full and accurate histories of the patients ; yet, as the exciting causes of rheumatism are generally very obvious, and have only been in operation a short time before the commencement of the symptoms and the period of admission into the hospital, it might be

expected that full information would generally be obtainable. Such, however, is not usually the case. Thus, though probably inquiry was made in all instances, in only 36 out of the 87 cases reported upon were definite exciting causes mentioned. In all but two of these, however, the disease was ascribed to chills or cold taken in various ways, and in the remaining two, cold was probably also the exciting cause; in one of them the patient, a printer's boy, being taken ill the following day after he had worked all night, and in the other the disease appearing a month after an attack of scarlet fever.

In 22 of the 36 cases the period which elapsed between the operation of the exciting cause and the development of the disease was mentioned. In four of these cases the symptoms commenced very soon after exposure to the exciting cause, in five on the following day, in eight in two or three days, in one in four or five days, in four in a week, and in one in two weeks. The patients, however, in some cases in which the accession of the disease was deferred, were suffering from the effects of a common catarrh before the rheumatic symptoms appeared. In several cases the disease occurred in females in the state of pregnancy, or who were exhausted by prolonged lactation.

The facts in reference to the former series of cases corresponded closely with these. In the 73 cases treated at the Surrey Gardens, between 1862 and 1868, the causes of the attacks were assigned in 32 instances, and in all but one of them the disease was ascribed to cold. The symptoms occurred on the same day in two cases, on the following day in one, in two days in two, in a week in five cases, and in from one to two weeks in seven cases; in two the cause was said to have operated three weeks before, and in one case a month before; but in the instances where the period was so prolonged the patient may have been exposed to cold after the time assigned, or may have laboured under slight symptoms which ultimately developed themselves into a rheumatic attack.

4. The circumstances which interfere with our readily obtaining full and accurate accounts of the causes of the attacks, equally render it often difficult to ascertain the precise periods during which the patients have been suffering from the disease before their admission into the hospital. It will, however, be seen by the table annexed that in two cases only was no in-

formation obtained on this point. Of the other cases 32 were admitted during the first week of illness, 25 in the second week, 11 in the third, 3 within one month, and the same number each within two months and three months. In 8 other cases the period at which the symptoms became more severe was alone ascertained, and in them it ranged from five days to two months.

5. A large proportion of the patients had had previous attacks of rheumatism before that for which they were treated. From the table it will be seen that in only ten cases was the attack expressly reported to have been the first, but in thirty-four other instances it may safely be inferred that inquiry was made and a negative answer obtained, so that the attack may be considered to have been most probably the first in 44 cases, while in 40 others the patients had previously had the disease on one or more occasions. Thus in 23 cases the attack was the second, in 8 the third, in 5 the fourth, in 2 the seventh, and in one the ninth, and one patient was said to have had several previous attacks, the precise number not being stated. A very interesting and important fact is the long period which often elapsed between the several attacks, showing that the susceptibility to the disease being once manifested, the patient can never after be considered safe from the danger of recurrence. Thus in the cases in which the attack was the second, the previous seizure had occurred at various periods ranging from 6 months to 19 or 20 years before. In the cases in which the seizure was the third, the first attack had occurred from 2 years to 32 years before. In those in which it was the fourth, the patient had first suffered three and four years before. In those in which it was the fifth the primary seizure took place in 2, and 24 years before; and in those in which it was the seventh, the first attack occurred in one case 14 years, in the other 26 years before. In one case, a boy, *æt.* 14, had had four previous attacks, the first of which took place when he was quite young; a second, eighteen years of age, had had six previous attacks, the first when he was four years old; a third, thirty years of age, had also had six previous attacks, the first of which took place when he was four years old; a fourth, thirty-nine years of age, had had two previous attacks, the first of which occurred when he was seven years old. A patient, who had had eight previous attacks, was twenty-nine,

and one who had had several, the precise number not being reported, was nineteen years of age.

The facts before reported upon very closely correspond with those now given. Thus of the 73 cases forming the third group of the former series, and consisting of patients treated at the Surrey Gardens before 1868, in reference to which there is full information on these points, 26 were reported to have had previous attacks, and these had occurred at periods varying from a few months to 9, 10, 11, 12, and 13 years before the seizure for which they came under treatment.

6. The disease was in much the largest proportion of cases of a mild or subacute character, the joint affections not being very intense or persistent, the temperature not generally very high or the fever severe, and the symptoms generally underwent a marked amendment soon after the patients' admission into the hospital. In comparatively few cases did the temperature exceed 103° F., and in none was it above 104° in the morning, or 104.4° in the evening. It must, however, be understood that the temperatures were not generally regularly taken till the cases came under my own notice, and this was often a day or two after their admission into the hospital.

Of the 87 cases 74 were instances of mild or subacute rheumatic fever, 10 of severe or acute rheumatism, and 2 of synovial and one of gonorrhœal rheumatism, the proportions being thus: 85.05 per cent., 11.4 per cent., and 3.4 per cent. respectively.

7. It will be seen from the general table, that of the whole of the cases treated, 15, or 17.24 per cent., presented some form of decided recent cardiac complication, uncombined with old disease, while 8 cases or 9.1 per cent. had recent disease superinduced upon old. Taking the two sets together, the cases of recent cardiac complication constituted 23, or 26.4 per cent. of the whole, or 1 case in 3.7.

In six cases, or 6.8 per cent., the patients, though presenting no evidence of recent cardiac affection, were the subjects of disease of the heart which existed before the occurrence of the rheumatic symptoms for which they were admitted into the hospital. Adding these to the former number, we get a total of 29 cases in which there was either recent or old cardiac complication, or 33.3 per cent., or 1 case in 3.

It will also be seen that in nine cases there are said to have been, either at the period of admission or afterwards, doubtful evidences of cardiac mischief, consisting in some morbid sounds or in symptoms of cardiac disturbance or both, which did not more fully develop themselves with the progress of the disease. If these be included in the enumeration, the cases of decided or doubtful cardiac complication are 38 or 43·6 per cent., or 1 case in 2·28, and there remain only 49 cases, or 56·3 per cent., or 1 case in 1·77, in which there was neither decided cardiac disease nor suspicion of any affection of the heart.

In addition to the 87 cases included in the calculation, there also occurred three other instances presenting the combination of old cardiac disease with recent rheumatic symptoms. In one of these a female, æt. 47, died the day after admission and before she was seen by myself, and the precise nature of the disease was not ascertained, permission to examine the body being refused. In a second case, a boy æt. 15, had slight rheumatic symptoms with pericarditis and pleuro-pneumonia at the time of his admission, and died in two months. On examination there was found obstructive and regurgitant disease of the aortic valves with regurgitation through the mitral orifice. In the third instance, a man, æt. 29, was admitted with rheumatic pains and had also old obstructive and regurgitant disease of the aortic valves, the sequence of acute rheumatism two years before. A female, æt. 49, was also admitted with facial neuralgia and was found to have incompetency of the aortic valves, but had never had rheumatic fever. In both the last cases the patients were discharged relieved from the rheumatic affection.

Taken as a whole the cases now reported upon afford somewhat better results, so far as respects the proportion of cardiac complication, than those formerly analysed. Thus, while in the former series the cases of decided cardiac complication, either recent only or recent and old combined, amounted to 53 out of 146 cases, or 36·3 per cent., or 1 case in 2·75; in the present series the number is only 23 out of 87 cases, or 26·4 per cent., or 1 case in 3·7.

In the former report I showed that there was a remarkable difference in the proportion of cardiac complication in the three series of cases which were analysed. Thus, of 21 cases treated

at the Royal Free Hospital, the number which had recent cardiac disease was 7, or 66·6 per cent., or 1 case in 1·5. Of 52 cases which occurred at Old St. Thomas's Hospital, London Bridge, 16 had recent cardiac complication, or 30 per cent., or 1 case in 3·2; and of 73 patients treated at the temporary hospital, Surrey Gardens, the number with decided recent cardiac complication was 23, or 45·7 per cent., or 1 case in 2·18.

In the present series there is also a great difference in the proportion of cardiac complication in the cases treated at different periods. Thus, of the 68 cases which occurred at the Surrey Gardens, there were 15 in which there was either recent disease alone or recent superinduced upon old heart affection, or 22·05 per cent., or 1 case in 4·5; while of the 19 cases treated in the new hospital at Westminster Bridge, the cases of recent disease, without or with old heart affection, were 8 in number, or 42·1 per cent., or 1 case in 2·3. This distinction might appear to depend on some difference in the course of treatment pursued, or on the condition of the new hospital being less favorable for the successful treatment of the cases; but neither of these suppositions can apply, for the treatment followed at both periods was the same, and, in by far the largest proportion of the cases, the cardiac symptoms had manifested themselves, more or less decidedly, before the patients were admitted into the hospital. It is, indeed, obvious that the comparison between these two periods is not a just one, for the small number of cases treated at the new hospital allows of very different results from purely temporary and accidental causes. It will also be apparent, if the number of cases admitted each year of the whole period embraced in the report and the amount of cardiac complication be compared, that in the cases treated at the Surrey Gardens there was even greater difference in the proportion of cardiac complication in different years than the difference which obtained between the cases treated at the two establishments.

Thus, in 1868, of 20 cases 5, or 25 per cent., had recent cardiac disease.

In 1869, of 16 cases 5, or 35·2 per cent., were similarly complicated.

In 1870, of 20 cases only 2, or 10 per cent., had cardiac

disease, and in the early part of 1871, of 12 cases, 3 or 25 per cent., were so complicated.

Taking the whole of the cases collected since 1846 and included in the two reports, 233 in number, 76 presented some form of decided recent cardiac affection, either alone or occurring in patients previously the subjects of heart disease, giving the proportion of 32·6 per cent., or 1 case in 3·06. In 15 other cases, also, there was old disease of the heart, or 6·4 per cent., or 1 case in 15·3. Of the two series of cases together there existed either recent or old disease of the heart in 91 out of the 233 cases, or in 39·05 per cent., or 1 case in 2·56 of those treated.

8. From the former analysis it did not appear that there was much difference in the amount of cardiac complication in the two sexes, the proportion being in males 37·1, and in females 35·1 per cent. The recent collection shows a more marked distinction in this respect to the disadvantage of males. Of the 52 males (deducting the cases of gonorrhœal and synovial rheumatism, 3 in number, leaving 49 cases) the number of instances of recent heart affection, either occurring alone or in combination with old disease, was 16, or 32·6 per cent., or 1 case in 2·8 per cent.; while of the 35 females, 7 only had recent disease, being in the proportion of 20 per cent., or 1 in 5 cases. If the cases of old disease be included, the total cases of heart affection in males is 19, or 38·7 per cent., or one case in 2·5; and in females 10, or 28·2 per cent., or 1 case to 3·5. Adding the cases included into the two reports together the results are as follows:—Of the 127 males (the cases of synovial and gonorrhœal rheumatism being deducted) 45 had recent heart affection, or 35·43 per cent., or 1 case in 2·8; and of the 103 females 31 had recent heart affection, or 30·09 per cent., or 1 case in 3·3. Including in the enumeration the 15 cases of old disease—8 males and 7 females—the cases of cardiac complication in the 127 males is 53, and in the 103 females 38, or in the proportions of 41·73 per cent., or 1 case in 2·3, and 36·89 per cent., or 1 case in 2·9.

9. The two series of cases agree in showing the much greater tendency for the heart to be affected in the cases of rheumatism which occur in early life than in those in persons at more advanced ages.

From the table it will be seen that of the whole of patients treated, 87 in number, forty-two were persons of twenty years of age and under, and of these 12 had some form of recent cardiac affection, either alone or in combination with old heart disease, being 30 per cent., or 1 case in 3·2; and forty-five were persons of twenty-one to forty-five years of age, and of these 11 had some form of recent cardiac complication, or in the proportion of 24·2 per cent. or 1 case in 4·09.

If at the former ages four cases be added and at the latter two, in which there was old disease uncombined with recent, the cases of all kinds of cardiac complication are in early life sixteen or 41·02 per cent., or 1 case in 2·4, and at the more advanced ages thirteen or 28·8 per cent., or 1 case in 3·4.

The greater liability to heart affection in early life is equally shown if the cases occurring in the two sexes at different ages be compared separately. Thus of the males, 49 in number, twenty-three were persons of 20 years of age and under, and of these 8 had heart complication, either alone or in combination with old disease, being in the proportion of 34·7 per cent., or 1 case in 2·8. Twenty-six were 21 to 39 years of age, and of these 8 had heart affection, or in the proportion of only 30·07 per cent., or 1 case in 3·2. Of the females, 35 in number, sixteen were 20 years of age and under, and in these the cases of recent cardiac disease were 4, or 25 per cent., or 1 case in 4. Nineteen were from 21 to 45 years of age, and of these 3 had recent disease, or 15 per cent, or 1 case in 6·3.

The cases of old disease being included in the calculation, the instances of heart complication in males, at 20 years of age and under, are eleven in number, or 47·8 per cent, or 1 case in 2·09. No case of old heart disease occurred in men at more advanced ages.

In the females, at the early ages, the cases of all forms of heart affection are five in number, or 31·2 per cent, or 1 case in 3·2, and at the more advanced ages five, or 26·3 per cent., or 1 case in 3·8.

The following table, founded upon the whole of the cases included in the two reports, shows the amount and kind of cardiac complication at the different ages and in the two sexes:

Report on Cases of Rheumatic Fever.

20 years of age and under. Total cases, 112.

Had recent cardiac disease . . 43, 33·3 per cent.

Had old disease 10

Total cases of cardiac complication . . 53, 47·3 per cent.

21 to 40 years of age. Total cases, 109.

Had recent cardiac disease . . 32, 29·3 per cent.

Had old disease 4

Total cases of cardiac complication . . 36, 33·04 per cent.

41 to 53 years of age. Total cases, 12.

Had recent cardiac disease . . 1, 8·3 per cent.

Had old disease 1

Total cases of cardiac complication . . 2, 16·6 per cent.

Males only.

20 years of age and under. Total cases, 58.

Had recent cardiac disease . . 24, 41·3 per cent.

Had old disease 7

Total cases of cardiac complication . . 31, 53·1 per cent.

21 to 40 years of age. Total cases, 68.

Had recent cardiac disease . . 20, 29·2 per cent.

Had old disease 1

Total cases of cardiac complication . . 21, 30·8 per cent.

41 to 53 years of age. Total cases, 4.

Had recent cardiac disease . . 1, 25 per cent.

Females only.

20 years of age and under. Total cases, 54.

Had recent cardiac disease . . 19, 35·1 per cent.

Had old disease 3

Total cases of cardiac complication . . 22, 40·7 per cent.

21 to 40 years of age. Total cases, 41.

Had recent cardiac disease . . 12, 29·2 per cent.

Had old disease 3

Total cases of cardiac complication . . 15, 36·5 per cent.

41 to 53 years of age. Total cases, 8.

Had old disease 1, 12·5 per cent.

The greater liability to cardiac complication in early life is equally shown by the mean age of the patients who were the subjects of cardiac disease being less than that of those in which such affection did not occur, and this rule applies both to males and females separately.

10. The proportion of cardiac complication did not appear, from the cases analysed in the former report, to differ much according to the intensity of the disease. Thus in the cases of more acute or intense rheumatic fever the instances of recent cardiac complication constituted 38·8 per cent. of those treated, or 1 case in 2·57, while in the subacute or less intense cases they amounted to 34·7 per cent., or 1 case in 2·8, showing only a slight excess in the more severe cases. In the cases now analysed the proportion of cardiac affection in the two classes of cases bears a very similar relation to that previously deduced.

Of 10 cases of acute or intense disease three had recent cardiac complication, either alone or in combination with old disease, being in the proportion of 30 per cent., or 1 case in 3·3. While of 74 less severe or subacute cases twenty had recent heart affection, either alone or combined with old disease, or 27·02 per cent., or 1 case in 3·7. The cases of gonorrhœal and synovial rheumatism were uncomplicated.

The former report showed, however, a very remarkable difference between the kind of cardiac complication which occurred in the two classes of cases, endocarditis being especially common in the cases of more severe disease, while pericarditis more particularly occurred in the slighter cases. Thus in the acute cases pericarditis or peri- and endocarditis occurred in the proportion of 7·4 per cent., and endocarditis alone in the proportion of 31·48 per cent. ; while in the subacute cases pericarditis and peri- and endocarditis occurred in 13·04 per cent., and endocarditis alone is 21·73 per cent. of the cases. The facts now collected are too few in number to institute a similar comparison in reference to them. The large proportion of cases, however, in which pericarditis occurred, either alone or in combination with endocarditis and with old disease, and the comparatively subacute or slight character of the majority of the cases of rheumatic fever which were treated, is in accordance with the same law. Thus it will be seen from the table, that of the 15 cases of recent disease seven were instances of pericarditis alone, and

seven of peri- and endocarditis combined, one only being a case of simple endocarditis; while in the eight cases in which there was recent disease superinduced upon old, in five the disease was pericarditic, in one there was peri- and endocarditis, and in one endocarditis only. In reference to one case the reports are defective. It is of constant observation in practice that pericarditis very frequently occurs when there are very trivial symptoms of rheumatism. Indeed, of the cases of pericarditis here referred to, in one only did the disease occur in a case of severe rheumatic fever, while in several the rheumatic symptoms were extremely slight.

11. The proportion of cases in which recent cardiac complication occurred, either alone or in combination with old disease, was decidedly greater in the cases in which there had been previous rheumatic attacks.

Thus it will be seen that there is good reason to suppose that in 44 cases the attack for which the patient came under treatment was the first that had occurred, and in these there were only 5 cases of heart affection, all of which were recent, or in the proportion of 11·3 per cent., or 1 case in 8·8; while of 40 cases in which the patients had had previous attacks, from one to eight in number, the cases in which recent cardiac complication occurred were 18 or 45 per cent., or 1 case in 2·2; and the number of cases of old disease alone was 6, making the total cases of cardiac complication 24, or 60 per cent., or 1 case in 1·66. This inference is in accordance with the conclusion deduced from the cases included in the former report. The proportion of cases in which there had been previous attacks was estimated in the whole of the cases, at 34·2 per cent., while in those in which cardiac complications occurred the proportion which had had previous attacks was 47·1 per cent.

12. The period during which the patient has been ill before admission into hospital varies so greatly in different cases of rheumatic fever, that it is impossible to institute any useful numerical comparison between the time which elapsed in ordinary cases and those in which there were recent cardiac complications; but it may be stated, generally that, in cases of given intensity, heart affections are more likely to be present and to be of serious importance when the admission is much deferred, than when a patient is admitted at an early period of

the disease. Thus it is found, that, in by far the largest proportion of cases, the cardiac symptoms or signs or both, have commenced before the admission of the patient; and it not unfrequently occurs, that, when first admitted, there are some slight evidences of heart affection which rapidly subside, but which would probably have attained a more serious form and been less readily removable, had the admission of the patient been deferred to a much later period.

Of the 53 cases of recent cardiac complication, included in the former report, in 44, or 83·09 per cent., there were evidences of disease at the time of the patients' admission, and in only 9, or 16·9 per cent., did the symptoms make their appearance while the patients were under treatment, and in some cases there were signs of disease at the time of the patients' admission which did not more fully develop themselves. In the present series, of the cases of uncomplicated recent cardiac affection, 15 in number, the disease was decidedly present on admission in seven cases, and commencing at the time of admission in five others. In three cases the signs were not marked till some days after the commencement of the treatment, though in two of these it is possible that there may have been some evidences of disease at the time of admission. In the eight cases in which there was recent disease superinduced upon old, in two it was decidedly present at the time of the patients' admission, and in four it was commencing at that time. In nine therefore of the 23 cases, the disease was present, and in nine it was commencing at the time of admission, or in 18 cases there were more or less decided evidences of cardiac complication when the patient was received into hospital; while in four or perhaps five cases the symptoms may have commenced, and certainly became marked, while the patient was under treatment. The former cases, therefore, constituted 78·2 per cent., and the latter 21·7 per cent. of the cases of uncomplicated recent cardiac affection.

13. In the former report it was stated that the probability of the entire removal of all traces of cardiac complication when it has occurred in the course of rheumatic fever, much depends upon the period which elapses after the commencement of the local disease before the patient comes under treatment. This inference is generally confirmed by the analysis of the present

series of cases. Thus, of twelve uncomplicated cases of rheumatic carditis, in which there were more or less decided signs of the cardiac affection when the patient was admitted into hospital, in seven the recovery was complete, while in five there remained some evidences of disease at the period of discharge. In the three cases in which the disease may have commenced after the admission of the patient, the signs entirely disappeared before discharge. Of the cases included in the former report there are also nine in which the signs of local disease are reported to have manifested themselves after the treatment had commenced—the period after admission ranging from 2 to 12 days—and in these the signs entirely ceased in five cases, had nearly disappeared in two, and still remained in two. So that of twelve cases in which the evidences of cardiac complication first manifested themselves or attained a marked degree after the admission of the patient, and where, therefore, they received the most prompt attention, in eight they entirely disappeared; in two they still remained in a slight degree; and in two they were decidedly present when the patient was discharged.

The probability of an entire removal of all the signs of cardiac disease, however, depends still more on the particular form which the disease assumes than on the early attention which it receives, pericarditis being certainly a more curable form of disease than endocarditis. This will be seen from the table; thus seven cases of uncomplicated pericarditis were all entirely cured, there being, however, in two of them some increased dulness on percussion in the præcordial region still remaining; while of seven cases in which with the pericarditis there was also some affection of the endocardium, the signs entirely disappeared in only two cases, and remained, to some extent, at the time of discharge in the five others. In one case of simple endocarditis the signs entirely ceased. When recent disease occurs in cases where the heart is previously unsound, it is often difficult or impossible to say whether the recent disease is entirely recovered from or leaves behind it some aggravation of the former mischief. Of the cases of this kind, eight in number, five were cases of pericarditis, and of these four recovered and in one the disease proved fatal. One case of peri- and endocarditis combined was recovered from but the condition of the heart was not clearly ascertained. In

one case the disease was endocarditis and the local affection first became marked during convalescence from a mild attack of rheumatic fever, though, as the patient had had several former attacks of rheumatism, the heart may not have been previously sound. In this instance decided disease remained. In one case the nature of the disease was not clearly reported. The patient who died was a boy, æt. 14, who had had two previous seizures within two years, in both of which he had been treated by myself in the hospital. From the first attack, which was very slight, he entirely recovered. In the second he had peri- and endocarditis, and left the hospital with signs of disease remaining. In the last attack the rheumatic symptoms were slight, but he had pericarditis and signs of old disease of the heart, and died 23 days after entering the hospital.

The general inference to be deduced from the facts now stated is, that when a case of rheumatic fever is complicated by the occurrence of simple pericarditis, the local disease will probably be recovered from without leaving behind it any obvious impairment of the condition of the heart. When, on the other hand, there is endocarditis, either alone or with pericarditis, and especially if the local disease becomes fully developed before the patient comes under treatment, there is great risk that some marked permanent defect in the heart will remain.

This remark, of course, applies only to the immediate evidences of disease, not to the effects which may ultimately ensue from rheumatic carditis, as laying the foundation of disease in after-life.

In the earlier series of cases of rheumatic fever included in the former report, the descriptions are not always so full and clear as to show whether the recent cardiac disease was a primary and uncomplicated affection, or supervened on some pre-existing defect. A perfectly satisfactory comparison cannot, therefore, be instituted between the inferences drawn from those cases and the facts included in the more recent series. Allowing, however, for this source of fallacy, it appears that of 44 cases of recent cardiac complication which are reported to have occurred in those cases, in 17 the signs entirely disappeared, and probably also in one other. In 7 cases the signs were not entirely gone when the last notes were taken, and in 16 they still existed in a marked degree, and probably also in three others. Adding to these numbers

the 12 cases of recent cardiac affection which occurred in the present series, of which 7 entirely recovered and 5 still manifested some signs of disease, we have a total of 56 cases, of which 25 may be considered to have entirely recovered, while 7 still presented some evidences of cardiac defect, and in 24 there existed decided signs. In 15 cases, including those in the former and present reports, there was recent affection with old heart disease, and of these twelve more or less completely recovered, and three of the patients died.

14. The only other serious complications which, in addition to the affections of the heart, occurred among the cases of rheumatism now reported upon, were inflammation of the lungs and pleuræ in six cases, slight chorea in one, and albuminuria in two cases. In four of the cases of pneumonia and pleurisy there was also cardiac complication. In two of these cases there was pleuropneumonia of the left side and pleurisy of the right, in the third pleuropneumonia of the left side only, and in the fourth pleurisy of the left side. In one of the other two cases there was double pleuropneumonia and bronchitis, and in the other pleurisy of the right side. In the case of chorea there was no obvious cardiac affection, and in the two cases of albuminuria the affection of the kidney was present when the patients were admitted into the hospital but soon subsided. There were also in these cases some evidences of cardiac disturbance, which did not more fully develop themselves. All these cases recovered.

In addition to the cases of rheumatic fever reported upon, in two other instances symptoms of acute rheumatism existed in combination with specific fever. In one of them, a female, æt. 23, was the subject of typhoid fever and had also pleurisy of the right side; in the other, a man, æt. 30, had scarlet fever and rheumatism. Both cases were free from cardiac complication. In the former report it is mentioned that rheumatic symptoms complicated two cases of scarlet fever and one of typhoid, and all these cases were free from heart affection and recovered.

15. The whole of the 87 cases of rheumatism recovered more or less completely, except one, in which the patient, a boy, whose case has been before referred to, died of pericarditis and old heart disease, in a third slight attack of rheumatism.

The rate of mortality in this set of cases is, therefore, 1·14

per cent. Of the 146 cases formerly reported upon two proved fatal, there being in both pericarditis and old valvular affection with pneumonia and pleurisy, and in one of them renal disease.

It will thus be seen that of the whole of the 233 cases included in two reports, three proved fatal, or 1.28 per cent., or 1 case in 77.6.

15. The treatment which was had recourse to for the relief of the rheumatic symptoms corresponded closely in the different cases. It consisted in the employment of bicarbonate of potash, alone or with nitrate of potash, in by far the majority of the cases. In some, and especially those of a more subacute character, iodide of potassium, bicarbonate of potash, and small doses of colchicum were used, and this was also the treatment in some cases in which subacute rheumatic affections remained after the more active symptoms had subsided. Dover's powder or opium were given when the patient was in great pain or was very restless at night; and with these remedies were occasionally combined, especially in the cases of cardiac or other complication, and when the tongue was much furred, small doses of grey powder or calomel.

As local applications blisters were very generally placed around the limbs above the affected joints, and several of them were often applied at the same time, and they were always followed by poultices. In four cases the blisters were had recourse to without any constitutional treatment. In the cases in which cardiac complication occurred, blisters and poultices were very generally applied over the region of the heart, and in one instance leeches were used, the general treatment being otherwise the same as in the other cases.

During convalescence quinine, bark, and iron were very generally given, and stimulants, brandy or wine, were exhibited during the progress of the cases as required.

16. It has been already stated that the period of the commencement of the attack before the admission of the patient could not be always precisely ascertained. The reports are also in some cases deficient as to the time at which the convalescence was established. In consequence of these defects it is only possible to give the period for which the patients were under treatment and the total duration of illness in 53 cases.

In 50 of these (three being excluded from the calculation for reasons which are stated in the table) the duration of treatment averaged 20·2 days and ranged from 3 to 46 days. In the same cases the duration of illness averaged 28·3 days and ranged from 11 to 56 days. The proportion of cures was pretty equally distributed between the 2nd, 3rd, 4th, 5th, and 6th weeks from the commencement of the symptoms, the largest proportion, or 22 per cent., having, however, occurred in the 4th week. In a smaller number of cases the period of active illness was prolonged to the 7th and 8th weeks.

In the uncomplicated cases the mean duration of treatment, and the duration of illness, were slightly less, or 20·09 days and 25·6 days respectively.

In the complicated cases both periods were extended, being 21·5 and 33·5 days.

17. The period during which the patients were retained in the hospital varied with the severity of the cases and their simple or complicated character; but in all, and especially when there had been any threatened or actual cardiac complication, the patients were usually retained till they had regained to a considerable extent their health and strength, to guard against the danger of relapse.

In the uncomplicated cases the period of residence averaged 30 days, and ranged from 8 to 76 days.

In the cases in which there were symptoms of cardiac disturbance which did not fully develop themselves, the average period of residence was 35·8 days, and the extremes 22 and 48 days.

In the cases presenting uncomplicated recent disease or recent and old disease combined, the mean period of residence was 59·5 days, and the extremes 23 and 122 days.

In the cases of old disease without any recent heart affection, the residence averaged 59·3 days, and ranged from 29 to 98 days.

In the cases before named, in which there were complications not cardiac, and also in a case in which dysentery supervened during convalescence, in another in which synovitis of one ankle occurred; and in a third in which there was œdema of the extremities, the mean period of residence was 50·7 days and the range from 29 to 78 days.

Brief abstracts of cases of decided cardiac complications.

CASE 1.—C. E—, male, æt. 30, admitted January 29th, 1868; two weeks ill on admission. Rheumatismus subacutus, second attack, the first occurred two years before. Symptoms of cardiac affection appeared four days before admission.

Recent peri- and endocarditis with old disease, obstr. and reg. of aortic valves; discharged July 31st; residence in hospital thirty-two days; pericarditis cured.

CASE 2.—H. C—, m. æt. 17, ad. September 19th, 1868; then ill two months. Rh. s. ac., second attack, the first two years before.

Pericarditis, the signs commencing on admission, and entirely gone thirty days after; discharged November 3rd; residence forty-five days.

CASE 3.—E. C—, f. æt. 14, ad. September 21st, 1868; worse one week. Rh. s. ac., fourth attack, first occurred when she was quite young.

Pericarditis and old disease, obstr. and reg. of a. v.; symptoms commencing on admission; discharged, pericarditis cured, November 15th; residence fifty-five days.

CASE 4.—C. W. T—, m. æt. 12, ad. October 12th, 1868; ill three weeks. Rh. s. ac., second attack, first three years before.

Pericarditis and old disease, obst. and reg. of a. v., and obstr. of m.; symptoms of p. coming on on admission, and apparently gone in eight days; discharged cured December 15th; residence sixty-three days.

CASE 5.—E. M—, f. æt. 24, ad. October 15th, 1868; worse two weeks; slight rh. s. ac., third attack, first four years before; old disease.

Discharged cured and relieved November 27th; residence forty-two days.

CASE 6.—A. P—, m. æt. 19, ad. October 29th, 1868; ill seven days. Rh. s. ac., second attack, first three years before.

Peri- and endocarditis; symptoms commencing on admission; murmur still remaining at apex at discharge; discharged January 9th, 1869; residence seventy-one days.

CASE 7.—J. G—, m. æt. 18, ad. October 6th, 1868; ill three days. Rh. s. ac., third attack, first four years before.

Old disease chiefly m. obstr. and reg; discharged January 15th, 1869; residence 100 days. (?) Phthisis incipiens.

CASE 8.—W. E—, m. æt. 25, ad. February 13th, 1869; ill four days. Rh. s. ac., second attack, first five years before.

Peri- and endocarditis; symptoms commenced three days before admission, and the signs had entirely gone eighteen days after ad.; discharged March 26th; residence forty-one days.

CASE 9.—H. de B—, f. æt. 13, ad. March 5th, 1869; ill three days; slight rh. s. ac., second attack, first four years before.

Peri- and endocarditis; symptoms commencing on admission, but not fully developed till six days after. Murmur remaining at apex, and also a murmur in

the course of the pulmonary artery at discharge on June 11th; residence ninety-eight days.

CASE 10.—W. A. J—, m. æt. 21, ad. May 13th, 1869; ill four days. Rh. s. ac. and bronchitis, second attack, first three years before.

Endocarditis; symptoms commencing on admission, and nearly gone at discharge on June 8th; residence twenty-five days.

CASE 11.—H. W—, m. æt. 32, ad. May 12th, 1869; ill two weeks. Rh. s. ac. fourth attack, first twelve years before.

Pericarditis; symptoms present on admission and entirely gone twenty-eight days after; discharged June 11th; residence twenty-nine days.

CASE 12.—M. A. H—, f. æt. 20, ad. September 22nd, 1869; ill three weeks. Rh. s. ac.

Pericarditis; symptoms decided when notes were first taken sixteen days after ad., and entirely gone fourteen days afterwards; discharged October 29th; residence thirty-seven days.

CASE 13.—J. L—, m. æt. 13, ad. October 11th, 1869; worse one week. Rh. s. ac., second attack, first two years before.

Old disease, probably both a. and m.; discharged relieved November 23rd; residence forty-two days.

CASE 14.—J. L—, m. æt. 22, ad. October 19th, 1870; ill nine days. Rh. ac., third attack, first three years before.

Peri- and endocarditis with pleurisy and plero-pneumonia; symptoms of heart disease commencing on admission, and murmur still remaining at apex at discharge on December 2nd; residence forty-four days.

CASE 15.—W. S—, m. æt. 15, ad. December 8th, 1870; ill three months, worse three weeks; very slight rh. s. ac., second attack, first five years before.

Peri- and endocarditis; signs present on admission. Murmur still remaining at apex on discharge on February 7th, 1871; residence sixty-one days.

CASE 16.—F. O—, m. æt. 13, ad. February 14th, 1871; ill ten days; slight rh. s. a., second attack, first a year and a half before.

Peri- and endocarditis; symptoms present on admission. Murmur still remaining at apex on discharge on April 17th; residence sixty-two days.

CASE 17.—H. R—, f. æt. 42, ad. March 14th, 1871; ill three months; slight rh. s. ac., second attack, first seven years before.

Old disease, mitral obstr.; discharged, rh. cured, heart disease relieved, April 12th; residence twenty-nine days.

CASE 18.—J. N—, m. æt. 22, ad. May 1st, 1871; ill one week; slight rh. s. ac., first attack.

Peri- and endocarditis with plpn. of right side and pleurisy of right side, cardiac symptoms coming on at time of admission and signs entirely gone nine days after; discharged June 27th; residence fifty-seven days.

CASE 19.—J. S. W—, m. æt. 23, ad. June 5th, 1871; ill three weeks; slight rh. s. ac., first attack.

Pericarditis and pl. of right side, signs of cardiac disease commencing on admis-

sion and gone twenty-four days after; discharged July 13th; residence thirty-eight days.

CASE 20.—F. O—, m. æt. 14, ad. October 12th, 1871; worse one week; slight rh. s. ac., third attack, first two years before (see No. 16).

Pericarditis and old disease; died November 4th; residence twenty-three days.

Pericardium covered with thick layer of somewhat firm lymph; heart greatly enlarged, weighed $15\frac{1}{4}$ oz., dilatation of left auriculo-ventricular aperture; lymph on pleura and fluid in sacs; congestion and remains of extravasation of blood in lungs; kidneys slightly diseased.

CASE 21.—W. S—, m. æt. 19, ad. October 3rd, 1871; ill two weeks. Rh. s. ac., several previous attacks. Taken in November 7th, when convalescent from rheumatism with violent palpitation following by signs of obstr. and reg. disease of a. v.; discharged February 2nd, 1872; residence 122 days.

CASE 22.—J. L—, m. æt. 28, ad. November 23rd, 1871; ill two weeks; slight rh. s. ac., second attack, first twelve years before.

Pericarditis; signs present on admission and entirely gone twenty-one days after; discharged January 16th, 1872; residence fifty-four days.

CASE 23.—L. K—, f. æt. 22, ad. December 16th, 1871; ill three days. Rh. ac. third attack, first four years before.

Pericarditis; symptoms doubtful on admission, but signs obvious three days after, and gone thirty-two days after that, except that there was some increase in the extent of præcordial dulness left; discharged April 5th, 1872; residence 110 days.

CASE 24.—J. M—, f. æt. 28, ad. December 13th, 1871; ill eight to fourteen days. Rh. ac., first attack. The symptoms closely resembled typhoid for some days after admission, there being, however, no eruption on the skin.

Pericarditis; symptoms doubtful on admission, but not distinct signs till nine days after; signs entirely gone thirty-one days after that, leaving only some slight increase in the extent of præcordial dulness; discharged April 8th 1872; residence 116 days.

CASE 25.—E. K—, f. æt. 17, ad. January 12th, 1872; worse two weeks; very slight rh. s. ac., third attack, first ten years before

Pericarditis; symptoms commencing on admission, and apparently gone in twenty-four days, ? old disease, mitral regurgitation; discharged cured of rheumatism and pericarditis, old disease remaining, May 14th; residence fifty-six days.

CASE 26.—J. J—, m. æt. 17, ad. January 22nd, 1872. Slight rh. s. ac.; second attack, first five or six years before; old disease, mitral region; discharged relieved March 8th; residence forty-five days.

CASE 27.—C. M—, m. æt. 18, ad. February 22nd, 1872; ill five days; very slight rh. s. ac., seventh attack, first when four years old.

Pericarditis and old disease; recent cardiac signs present on admission, and entirely gone nine days after; discharged April 9th; residence forty-six days.

CASE 28.—A. B—, f. æt. 13, ad. January 8th, 1872; ill eight days; very slight

rh. s. ac.; third attack, first five years before; old disease, mit. obstr. and reg.; discharged, rh. cured, old disease relieved, April 9th; residence 98 days.

CASE 29.—J. F—, f. æt. 21, ad. February 10th, 1872; ill two weeks. Rh. s. ac.; second attack, first seven years before.

Pericarditis and old disease, mitral regurg.; signs of recent cardiac disease coming on admission, and entirely gone twenty-three days after; discharged, rheumatism and pericarditis cured, and old heart disease relieved, May 22nd; residence 101 days.

Brief abstracts of serious complications not cardiac.

CASE 1.—M. B—, f. æt. 18, ad. December 23rd, 1868; ill three weeks. Rh. s. ac. Albuminuria at time of admission; slight prolongation of systolic sound of heart at apex. Discharged cured February 12th; residence fifty-one days.

CASE 2.—E. H—, f. æt. 25, ad. October 21st, 1869; ill two weeks. Rh. s. ac. Slight chorea; systolic murmur heard at the base and probably in the course of the pulmonary artery. Discharged cured December 16th; residence fifty-six days.

CASE 3.—J. L—, m. æt. 22, ad. October 19th, 1870; ill nine days. Rh. ac. Pericarditis. Pleuropneumonia of left side and pleurisy of right side. Discharged cured December 2nd; residence forty-six days.

CASE 4.—M. A. S—, f. æt. 15, ad. April 11th, 1870; ill one week. Rh. s. ac. Double pleuropneumonia and bronchitis. Discharged cured June 28th; residence seventy-eight days.

CASE 5.—W. S—, m. æt. 15, ad. December 18th, 1870; ill three months, worse three weeks. Very slight rh. s. ac.; peri- and endocarditis; pleuropneumonia of left side. Discharged cured February 7th; residence sixty-one days.

CASE 6.—J. H—, m. æt. 16, ad. March 2nd, 1871; ill one month, worse four days. Rh. s. ac. Albuminuria on admission; systolic sound prolonged over whole surface of heart. April 25th, cured; residence fifty-four days.

CASE 7.—J. N—, m. æt. 22, ad. May 1st, 1871; ill one week. Very slight rh. s. ac.; peri- and endocarditis; pleuropneumonia of left side and pleurisy of right side. Discharged June 27th, slight dulness remaining at lower part of left side; residence fifty-one days.

CASE 8.—J. S. L—, m. æt. 23, ad. June 5th, 1871; ill three weeks. Slight rh. s. ac.; pericarditis; pleurisy of left side. Discharged July 13th cured; residence thirty days. A murmur, probably in the course of the pulmonary artery, was heard before discharge.

CASE 9.—J. J—, m. æt. 31, ad. January 25th, 1872; ill eight days. Rh. s. ac.; pleurisy of right side. Discharged cured March 1st; residence thirty-five days.

Cases of Rheumatismus Acutus and Subacutus (Rheumatic Fever) treated at St. Thomas's Hospital during each year from the spring of 1868 to the same period of 1872.

1868.	Cases 20, of which had recent heart affection	2	} 5 cases = 25 per cent., or 1 case in 4.
	recent and old combined	3	
	old	2	
	doubtful	2	
1869.	Cases 16, of which had recent heart affection	5	= 35·2 p. c., or 1 in 3·2.
	old	1	
	doubtful	1	
	(Including 1 case of gonorrhœal and 2 of synovial rh.)		
1870.	Cases 20, of which had recent heart affection	2	= 10 p. c., or 1 in 10.
	doubtful	2	
1871, to June.	Cases 12, of which had recent heart affection	3	= 25 p. c., or 1 in 4.
	old	1	
	doubtful	2	
	Total cases at Surrey Gardens	68	
	Had recent heart disease or recent and old combined	15	} = 22·05 per cent., or 1 case in 4·5.
	1871, September to end of year, and 1872, to April.		
	Cases 19, of which had recent heart affection	3	} 8 = 42·1 per cent., or 1 case in 2·3.
	recent and old	5	
	old	2	
	doubtful	2	
Total 87 cases.	Recent heart affection	15	= 17·24 per cent.
	Recent and old	8	= 9·19 „
	Old	6	= 6·8 „
	Doubtful	9	= 10·3 „
	Cases of recent heart affection, and of recent and old combined	23	} = 26·4 per cent., or 1 case in 3·7
	Cases of recent, recent and old combined, and old disease	29	
	Cases of recent, recent and old combined, old, and doubtful	38	} = 43·6 per cent., or 1 case in 2·28.

and 43, were free from cardiac complications. In the third, æt. 42, there was old disease.

Of the males (the cases of gonorrhœal and synovial rheumatism being omitted from the calculation) 49 in each.

Were 20 years of age and under 23

Of these were entirely free from cardiac complication or presented only doubtful signs . . . 12

Had recent disease alone or combined with old heart affection	8	} = 34·7 p. c., or 1 case in 2·8.
Had old disease only	3	
		11 = 47·8 p. c., or 1 case in 2·09.

Were 21 to 39 years of age 26

Of these were entirely free from cardiac complication or presented only doubtful signs . . . 18

Had recent disease alone or combined with old heart disease	8	= 30·07 p. c., or 1 case in 3·2.
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Of the females, 35 in number,

Were 20 years of age and under 16

Of these were entirely free from cardiac complication or presented only doubtful signs . . . 11

Had recent disease alone or combined with old heart disease	4	} = 25 p. c., or 1 case in 4.
Had old disease only	1	
		5 = 31·2 p. c., or 1 case in 3·2.

Were 21 to 45 years of age 19

Of these were entirely free from cardiac complication or presented only doubtful signs . . . 14

Had recent disease alone or combined with old heart disease	3	} = 15 p. c., or 1 case in 6·3.
Had old disease only	2	
		5 = 26·3 p. c., or 1 case in 3·8.

The mean age of the males without heart affection or with only doubtful symptoms, was 24·4 years; the extremes of age being 39 and 12.

With recent disease alone or with old disease 20·6; extremes 32 and 12.

With old disease only 16; extremes 18 and 13.

The mean age of the females without heart affection or with only doubtful symptoms, 24·2 years; the extremes of age being 45 and 15.

With recent disease alone, or with old disease 19·2; extremes 28 and 13.

With old disease only 26·3; extremes 42 and 13.

Duration of illness before admission in all cases.

1 day in 1 case	}	32 in the 1st week.
2 days in 1 case		
3 days in 3 cases		
4 days in 10 cases		
5 days in 3 cases		
6 days in 1 case	}	25 in the 2nd week.
1 week in 13 cases		
8 days in 3 cases		
9 days in 3 cases		
10 days in 1 case		
12 days in 2 cases	}	
8 to 14 days in 1 case		
2 weeks in 15 cases.		
3 weeks in 11 cases.		
1 month in 2 cases	}	3
1 month, worse 4 days, in 1 case		
5 weeks in 1 case	}	3
2 months in 1 case		
2 months, worse 3 weeks, in 1 case	}	3
10 weeks in 1 case		
3 months in 1 case		
3 months, worse 3 weeks, in 1 case	}	The former duration of illness not being stated. In 2 cases no report is made of the duration of illness at the time of the patient's admission.
1 year, worse 4 days, in 1 case		
Worse 5 days in 1 case		
Worse 1 week in 3 cases		
Worse 10 days in 1 case		
Worse 2 weeks in 1 case	}	
Worse 2 months in 1 case		

Duration of illness before admission in cases of recent and recent old cardiac complication only.

3 days in 2 cases.	}	The precise duration not being reported.
4 days in 2 cases.		
1 week in 3 cases.		
9 days in 1 case.		
10 days in 1 case.		
8 to 14 days in 1 case.		
2 weeks in 4 cases.		
3 weeks in 3 cases.		
2 months in 1 case.		
3 months, worse 3 weeks, in 1 case.		
Worse 5 days in 1 case	}	
Worse 1 week in 2 cases		
Worse 2 weeks in 1 case		
23 cases.		

Whether a first attack, or the patient had had the disease previously, and the proportion of cardiac complication.

	Healthy.	Recent and old.		Old.
Expressly stated to have been the first attack	7 cases	...	3	0
2nd attack (doubtful signs 4)	8 „	...	11	4
3rd „ (doubtful signs 1)	4 „	...	3	1
4th „	2 „	...	2	1
7th „	1 „	...	1	0
9th „	1 „	...	0	0
Several . . . . .	...	...	1	0
Not stated	32 „	...	2	0
	55		23	6

Not stated above—Synovial, 2, and Gonorrhœal, 1.

In 40 cases, therefore, there had been one or more previous attacks—47·6 per cent.

In 10 cases it is expressly stated that there had been no previous attack, but it may safely be inferred that in nearly all, if not in all the other 34 cases, inquiry was made and answered in the negative. Assuming this to be the case the number of cases in which the attack was the first was 44, or 52·3 per cent.

In the 40 cases of which there had been one or more previous attacks the number of cases in which recent cardiac complication occurred was 18, or 45 per cent., or 1 case in 2·2. Or including the old cases, 6 in number, the total cases of cardiac calculation was 24, or 60 per cent., or 1 case in 1·66.

In the 44 cases in which the attack was probably the first the number of cases with recent cardiac complication was 5, or only 11·3 per cent., or 1 case in 8·8.

Number and date of previous attacks.

2nd attack.	1st 6 months before.
2nd „	1st 6 months before.
2nd „	1st 2 years before.
2nd „	1st 2 years before.
2nd „	1st 2 years before.
2nd „	1st 3 years before.
2nd „	1st 3 years before.
2nd „	1st 3 years before.
2nd „	1st 4 years before.
2nd „	1st 4 years before.
2nd „	1st 4 years before.
2nd „	1st 4 years before.
2nd „	1st 5 years before.
2nd „	1st 5 years before.
2nd „	1st 5 years before.
2nd „	1st 5 years before.
2nd „	1st 5 years before.
2nd „	1st 5 or 6 years before.
2nd „	1st 6 years before.
2nd „	1st 7 or 8 years before.
2nd „	1st 7 years before.
2nd „	1st 7 years before.
2nd „	1st 19 or 20 years before, æt. 26.
3rd „	1st 2 years before.
3rd „	1st 3 years before.
3rd „	1st 4 years before, 2nd 2 years before.
3rd „	1st 4 years before.
3rd „	1st 4 years before.
3rd „	1st 8 years before, 2nd 2 years before.
3rd „	1st 10 years before, 2nd 1½ years before.
3rd „	1st 32 years before, 2nd 24 years before, æt. 39.
4th „	1st 3 years before.
4th „	1st 4 years before.
4th „	1st 12 years before, æt. 32.
4th „	1st when quite young, æt. 14.
4th „	1st 24 years before, æt. 45.
7th „	1st 14 years before, æt. 18.
7th „	1st 26 years before, æt. 30.
9th „	Æt. 29.
Several previous attacks. Æt. 19.	

Cases in which the attack is stated or may be inferred to have been the—

1st	.	.	.	.	.	44
2nd	.	.	.	.	.	23
3rd	.	.	.	.	.	8
4th	.	.	.	.	.	5
7th	.	.	.	.	.	2
9th	.	.	.	.	.	1
Several previous attacks	.	.	.	.	.	1
						<hr/> 84

Two cases of synovial rheumatism, and one of gonorrhœal, are excluded from this calculation.

The period which elapsed between the attack for which the patient was admitted and the first was in cases of the—

2nd attack. 23 cases.—6 months . in 1 case.
 2 years . in 3 cases.
 3 years . in 3 cases.
 4 years . in 4 cases.
 5 years . in 6 cases.
 5 to 6 years in 1 case.
 6 years . in 1 case.
 7 years . in 2 cases.
 7 or 8 years in 1 case.
 19 or 20 years in 1 case.

3rd attack. 8 cases.—2 years in 1 case.
 3 years in 1 case.
 4 years in 3 cases.
 8 years in 1 case.
 10 years in 1 case.
 32 years in 1 case.

4th attack. 5 cases.—3 years in 1 case.
 4 years in 1 case.
 12 years in 1 case.
 24 years in 1 case.

In 1 case, a boy, æt. 14, was stated to have had the first attack when quite young.

7th attack. 2 cases.—14 years in 1 case.
 26 years in 1 case.

Assigned cause of attack and period after exposure at which the symptoms appeared.

Having taken cold immediately before in 2 cases.

Got wet through, and the symptoms appeared immediately after in 2 cases.

Standing on wet ground, and the symptoms appeared the day after.

Took cold in working, and the symptoms appeared the day after.

Got wet through and remained a short time in wet clothes, and the symptoms appeared the day after.

Got heated by working in the streets and was then chilled by a fall of rain and kept on wet clothes; the symptoms appeared the following day.

Worked all night, and the symptoms appeared the next day.

Took cold, and the symptoms appeared in two days.

Got wet through, and the symptoms appeared in two days.

Got feet wet, and the symptoms appeared in two or three days.

Got wet through on the top of an omnibus two or three days before the symptoms came on.

Walking on damp ground without shoes, and the symptoms appeared in three days.

Took cold from swimming in a bath three days before the commencement of the symptoms.

Got wet through three days before the commencement of the symptoms.

Took cold, and the symptoms appeared in three days.

Fell into the water four or five days before the symptoms began.

Got wet through and allowed clothes to dry on, and the symptoms appeared a week after.

Exposure to cold, and the symptoms appeared a week after.

Got wet through, and allowed clothes to dry on; had sore throat immediately after, and rheumatic symptoms appeared in a week.

Took cold, and symptoms appeared a week after.

Got wet through, and allowed clothes to dry on, and symptoms appeared two weeks after.

Assigned causes of disease when the time of exposure is not specified.

Working in hot rooms, and then going into the cold.

Sleeping in a damp bed.

Cold taken in bathing.

Getting feet wet in the morning, and continuing so all day.

Getting wet through in two cases.

Chilled by sitting on the grass on Easter Monday, 1870.

Took cold from working in a shop into which the rain came.

Getting heated in working, and then chilled.

Getting chilled on the river.

Getting frequently wet and chilled.

Having taken cold during her confinement, five months before, and having chills and colds frequently after.

The appearance of scarlet fever a month before the commencement of rheumatism.

It thus appears that in only 36 out of the 87 cases were definite exciting causes assigned for the production of the disease, and of these in 34 cases the disease was ascribed to chills or cold taken in different ways. In the remaining two cases cold also was probably the exciting cause. In one the patient, a printer's boy, ascribed his attack to having worked all night. In the other the attack came on in a medical student, æt. 34, a month after an attack of scarlet fever. In some cases the disease was apparently predisposed to by pregnancy and over lactation.

In 23 cases the period which elapsed between the operation of the exciting cause and the development of the symptoms is specified. In 4 of them the symptoms commenced almost immediately after the operation of the cause.

In 5 on the next day, in 2 in two days, in 2 in two or three days, in 4 in three days, in 1 in four or five days, in 4 in a week, and in 1 in two weeks.

Forms of the disease and proportions of cardiac complication in each.

Rheumatismus acutus	10 cases = 11·4 per cent.	} 87 cases.
" subacutus	74 " = 85·09 "	
Gonorrhœal rheumatism, 1 }	3 " = 3·4 "	
Synovial " 2 }		
Of the 10 cases of acute rheumatism, were free from cardiac complication or only presented doubtful signs		
Had recent disease alone or combined with old heart affection	3	= 30 per cent., or 1 case in 3·3.
Of the 74 cases of subacute rheumatism, were free from cardiac complication or only presented doubtful symptoms.		
Had recent heart affection alone or combined with old disease	20 cases = 27·02 per cent., or 1 case in '7	} 26 cases = 35·1 per cent., or 1 case in 2·8.
Had old disease only	6 " = 8·1 per cent.	
The cases of gonorrhœal and synovial rheumatism were uncomplicated.		

Result of cases of cardiac complication as to the time of commencement of the cardiac symptoms, and the form which they assumed.

In recent cases only, 15 in number—

Symptoms and signs present on admission, 7 cases:—

Signs were entirely gone 9 days after.

" " 18 "

" " 21 "

" " 24 "

" " 28 "

Murmurs remained at the apex in 2 cases.

Symptoms or signs or both, coming on admission, 5 cases:—

Signs entirely gone 30 days after.

Signs nearly gone 25 days after.

Murmurs remained at apex in 3 cases.

Reported three days after admission, and signs entirely gone thirty-two days after that.

Doubtful on admission, and decided nine days after; entirely gone thirty-one days after that.

In both these cases there remained some increased dulness on percussion at the time of the patient's discharge.

Fully developed when notes were first taken sixteen days after admission, and almost entirely gone fourteen days after that.

Of the 15 cases, were cases of pericarditis only 7, and the signs had disappeared in six cases (except some increase of the dulness on percussion in 2), in twenty-one, twenty-four, twenty-eight, thirty, thirty-one, and thirty-two days, and were almost entirely gone in fourteen days in one case.

Were cases of peri- and endocarditis 7, and of these the signs were gone in nine and eighteen days in 2 cases, and murmurs remained at the apex at the time of discharge in 5 cases.

Was endocarditis only one case, and the signs had nearly gone in twenty-five days.

Of the cases in which there was recent disease in combination with old, 8 in number,

The signs of recent affection were present on admission in 2 cases, and had gone in nine days in one; the other died in twenty-three days.

The signs and symptoms in both were commencing on admission in 4 cases, and they were apparently gone eight days after; were entirely gone twenty-three days after; and apparently entirely gone when the notes were taken twenty-four days after.

In one the time of disappearance of the recent signs is not recorded.

In a case in which the recent symptoms occurred four days after admission the time of disappearance is not recorded.

In one case in which the signs became fully developed during convalescence from the rheumatic symptoms, thirty-five days after admission, though it was doubtful whether the heart was previously sound, decided disease of the aortic valves remained at the time of the patient's discharge.

Of these cases were cases of pericarditis 5; and the signs had gone in nine days; were apparently gone in eight days; entirely gone in twenty-three days; apparently gone in twenty-four days; and one patient died in twenty-three days.

In one case the disease was peri- and endocarditis, and the period of subsidence of the acute symptoms is not recorded.

In one case of endocarditis of the aortic valves, decided disease remained.

In one the nature of the affection is not reported.

TREATMENT.

The cases in which there was no cardiac complication or only doubtful signs were treated with Potassæ Bicarb. only, in 16

cases ; with Pot. Bicarb. and blisters, 7 ; with Potass. Bicarb. and Nit., 2 ; with Pot. Tart., 2 ; with Pot. Bicarb., and Hydrarg. c. Cretâ, or Cal. and Pulv. Ipecac. co., 2. Pot. Bicarb. was first given and afterwards Pot. Iod., &c., in 3 ; Pot. Iod., Pot. Bicarb., and Colchicum were given (Hydrarg. c. Cretâ and Pulv. Ipecac. co., in 2) in 13.

The only treatment used was the application of blisters, in 5 cases. Blisters also were applied, in conjunction with other treatment, in 14 cases, exclusive of those mentioned above.

Bark or quinine and iron were given alone in 2 cases, and frequently during convalescence after the other treatment had been discontinued.

The cases in which recent cardiac complication occurred, either alone or combined with old disease, were treated with Pot. Bicarb. only, 2 cases ; with Pot. Bicarb. and blisters, 3 ; with Pot. Bicarb., Cal. or Hydrarg. c. Cretâ, and Pulv. Ip. co., 5 (leeches applied in 1 case and blisters in another) ; with Pot. Bicarb. and Nitr., and blisters, 3 ; with Pot. Tart., Cal. or Hydrarg. c. Cretâ, and Pulv. Ip. co. and blisters, 4 ; with Pot. Chl. and Dec. Cinchonæ, 1 ; with Pot. Iod., Pot. Bicarb., and Colch., 4 (Hydrarg. c. Cretâ, Pulv. Ip. co., and blisters in 1), with Cal. and Pulv. Ip. co. and blisters, 1.

Duration of treatment and total duration of active illness.

In 50 cases the period of attack before admission and the time of established convalescence is given in the reports.

In these the mean period which elapsed between the admission of the patient and the completion of the convalescence was 20·2 days, and the range was from three, five, and seven to forty-five and forty-six days.

In the same cases the mean period from the commencement of the symptoms to the completion of the convalescence was 28·3 days, and the range from eleven and twelve to fifty-three and fifty-six days.

The following table gives the total duration of illness in these cases.

7 to 13 days inclusive, 8 cases, 16·0 per cent.			
14 to 20	"	8	" " "
21 to 27	"	11	" 22·0 "
28 to 34	"	8	" 16·0 "
35 to 41	"	7	" 14·0 "
42 to 48	"	3	" 6·0 "
49 to 55	"	5	" 10·0 "

In one case, not included in the calculation, in which there was pericarditis, the duration of treatment before convalescence was thirty-four days, the total duration of illness was forty-two to forty-eight days.

In a second—the case of gonorrhœal rheumatism—the period from admission to convalescence was forty-six, and the total duration sixty-nine days.

In a third instance, in which there was bronchitis, pneumonia, and pleurisy, the duration of illness from admission was fifty-four and the total duration seventy-one days.

Mean period of treatment in 32 uncomplicated cases was 20·09 days.

Extremes 3 and 7 days.

" 42 and 39 days.

The mean duration of active illness in the same cases . 25·6 days.

Extremes 7, 11, and 12 days.

" 56 and 53 days.

Mean period of treatment in 4 cases presenting doubtful evidences of cardiac complication was . 17 days.

Extremes 5 and 15 days.

" 20 and 28 days.

The mean duration of illness in the same cases was . 30·5 days.

Extremes 12 and 29 days.

" 52 days.

Mean duration of treatment in 14 cases in which there was recent cardiac disease alone or superinduced upon old was . 21·5 days.

Extremes 7 and 8 days.

" 45 and 46 days.

Mean duration of illness in the same cases was . 33·5 days.

Extremes 21 and 22 days.

" 40 and 48 days.

Duration of residence in the hospital.

In cases entirely uncomplicated, exclusive of 2 cases of synovial rh., and 1 of gonorrhœal, 40 cases.

Mean period of residence 30·8 days.

Extremes 8, 12, 14, 15, 16 (2), 17, 18 (4), 19, 20, 21 (2), days.

„ 76, 64, 62, 56 days.

In cases in which the evidences of cardiac complication were doubtful, 7 cases.

Mean period of residence 35·8 days.

Extremes 26 days.

„ 48 „

In cases of recent cardiac complication and of recent and old combined, 23 cases.

Mean period of residence 60·2 days.

Extremes 23, 24, 25, 29 days.

„ 122, 116, 110, 101 days.

In cases of old cardiac disease, 6 cases.

Mean period of residence 59·3 days.

Extremes 29, 42 days.

„ 100, 98 days.

In cases of other complications, not cardiac, 8 cases.

Mean period of residence 50·7 days.

Extremes 29, 32 days.

„ 78, 71 „

VARIETIES OF GENERAL PARALYSIS.

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THE term "general paralysis" is applied to cases in which all the four limbs, with or without some of the muscles of the head and neck, are more or less paralysed. In some instances the name would be appropriately used, although the paralysis might not be so extensive as this. Thus, a patient with a certain characteristic mental derangement, together with quivering of the lips and thickness of speech, might be fairly said to be suffering from "general paralysis of the insane," although none of the limbs were affected, because there would be strong reason for believing that the disease giving rise to the symptoms present was likely to be progressive, and ultimately to involve the whole motor system. Paralysis of three limbs would usually indicate a progressive or general form of disease, but not always. Thus, a patient was in the hospital last year who was recovering from hemiplegia, when he was attacked with paraplegia. Here was simply a combination of these two conditions, and there was no reason to expect that the paralysis would become more general.

The following are the principal varieties of general paralysis :

1. Hæmorrhage into the pons Varolii produces it. It is also a common thing for hæmorrhage which begins in one side of the brain to gradually fill both ventricles, and paralysis which was at first unilateral becomes general.

2. Concussion of the brain may also cause general paralysis, which is either quite transient or may last for some hours.

3. In rare cases adventitious growths and abscesses within the skull produce general palsy.

4. General paralysis of the insane.

5. Myelitis of the cervical region of the cord will produce general paralysis. It usually depends on caries, occasionally on tumour, as in the interesting case related by Dr. Todd in his 'Clinical Lectures on Paralysis,' in which softening of the cervical cord was produced by pressure of an enlarged odontoid process.

6. Myelitis of the lower part of the cord sometimes spreads upwards, paraplegia passing into general paralysis.

7. As regards spinal meningitis, there is no true paralysis in the acute form if unaccompanied by myelitis. There is stiffness of the limbs and body, partly from tonic spasm, partly, according to Dr. Radcliffe, from instinctive dread of moving. Cases occasionally occur, however, apparently of chronic meningitis, in which there is well-marked general paralysis, probably from involvement of the underlying cord, constituting what Dr. Reynolds calls "chronic meningo-myelitis." This is a form of disease which is especially apt to occur as a result of railway injuries.

8. General spinal paralysis.

9. Infantile paralysis is occasionally general in its distribution. Thus, out of sixty-two cases analysed by M. Duchenne the younger, in forty-two a single limb was paralysed, in nine there was paraplegia, in five general paralysis, and in the rest other combinations.

10. Paralysis agitans is not, properly speaking, a paralysis at all. True, the affected muscles get weak after a time; but so they do in chorea, which is not usually esteemed a form of palsy. The kind of paralysis agitans, however, which is produced by exposure to the fumes of mercury, and which is also said to occur in the case of workers in lead mines, is followed, after a time, by true general paralysis.

I may also mention that M. Duchenne, in his work on localised electrification, gives instances in which exposure to the influence of lead has produced paralysis of all the limbs, not

preceded by shaking palsy. In one case, general paralysis resulted from working in white lead for only ten days.

11. There are forms of paralysis which we must provisionally term "functional," the most important of which is that which sometimes follows diphtheria.

12. Lastly, we have hysterical paralysis, which may be general in its distribution. This is, perhaps, a more truly functional disease than the last mentioned, but it is of sufficient importance to merit separate enumeration.

It would be out of the question to endeavour, in this paper, to illustrate all these varieties of paralysis. I shall, therefore, limit myself to giving clinical sketches in illustration of three of them, and I shall select the fourth, the eighth, and the last.

I propose to devote the largest amount of space to the illustration of "general spinal paralysis," inasmuch as it is a disease to which much less attention has been paid in this country than it deserves. Many years ago, both Abercrombie¹ and Brodie² described cases of chronic progressive paralysis, evidently spinal, in which the utmost care failed to detect any disease, either in the brain or spinal cord. In 1853, Duchenne described it as being a form of disease presenting well-marked characteristics, and gave to it the name of "paralysie générale spinale." Nevertheless, I find no notice of it in any of the English text-books, excepting 'Reynolds's System of Medicine,' in which Dr. Radcliffe gives a meagre account of it; nor is there any place assigned to it in the nomenclature of diseases of the London College of Physicians. That it is not a particularly rare disease may be inferred from the fact that we have had at least three cases in the hospital during the last few months.

1. GENERAL PARALYSIS OF THE INSANE.

We have had at least three cases of this interesting disease in the hospital during the present year, but I shall content myself with giving the history of one only of these in detail. It is a case which presents some special features of interest,

¹ 'Diseases of the Brain and Spinal Cord,' first edition, p. 398.

² 'Lancet,' December 23rd, 1843.

and although a careful survey of the whole of the symptoms leads me to the conclusion that the man is suffering from general paralysis of the insane, it will be readily understood that I hold this opinion with some diffidence when I mention that Dr. Harley, under whose care the patient was, arrives at a different conclusion, and considers the case to be one of abscess of the brain. What are the special points which tend to support the one diagnosis or the other may be gathered from the following narrative.

CASE 1.—James W—, *et. 40*, a porter, was admitted on December 30th, 1871.

He had had very good health, had been temperate, and had not had venereal disease. There was no history of insanity in the family.

In July, 1871, while the patient was standing in an area helping to move furniture, a chest of drawers fell on him and struck him on the outer side of the right orbit, producing a wound from which he lost a good deal of blood. He was insensible for three or four minutes, then went home, feeling rather faint, but returned to his work the same afternoon, and continued at work for about a month, but was then obliged to give up, as he was getting so ‘weak and light-headed.’ This was his own account.

His wife gave some further particulars. The first thing noted was that his legs began to fail him. This was some three weeks after the accident. The arms also became weak, especially the left, and about the same time he began to exhibit strange forgetfulness, and his speech was observed to be getting indistinct. He remained at home about four months, during which time he was becoming gradually weaker in body and mind. He was always quiet, but was perpetually fidgeting about, doing unnecessary things, such as altering clocks, taking the lock off the door, and such like. His memory had failed much, and there had been marked insomnia for some weeks before admission. He had suffered more or less from headache ever since the accident, but had never had any acute or severe pain. He had several times fallen down, his legs appearing to give way under him.

State on admission.—A well-built man, of good muscular development. It was noticed that he was always twisting his head, mouth, and eyes about, and fidgeting with his hands. The grasp of his hands was defective, especially that of the left. He could walk fairly well, but often staggered to some extent, and it appeared to require some effort to keep straight. He talked indistinctly, somewhat like a man who is eating, and there was also some hesitation in his speech, perhaps due to the choreic movements of the muscles of the mouth. He complained of queer feelings rather than of pains in his head. There were two scars at the outer side of the right orbit, but no appearance of there having been a fracture. The pupils were somewhat dilated, and the right more so than the left. He thought his sight was weaker than formerly, but otherwise the senses were unaffected. His tongue was clean and protruded straight, and his appetite good. There was at this time no very definite evidence of mental alienation beyond what has been given above. He answered questions quite rationally, appeared to have

no delusions, and was not particularly melancholic; there was, however, considerable impairment of memory.

This patient remained in the hospital nearly five months. During this time he got much weaker, both bodily and mentally. He frequently stumbled, and could not stand on one leg. His arms also became much weaker, and when he went out there was no material difference in the condition of the limbs of the two sides. His urine dribbled away. He became haggard-looking and emaciated. He rarely complained of headache, and then it was not acute. Slept well; appetite ravenous; always thirsty. He still spoke slowly and hesitatingly. On the 20th of March, while sitting by the fire, he was suddenly seized with general weakness and fell down, but was not convulsed; he remained torpid and did not speak for a few minutes.

As regards his mental condition, his memory became more and more defective, so that he hardly recollected anything from one minute to another. He was always quiet and reserved, but contented; he never became excited, but was very restless. He was continually wandering about the ward, picking up other people's things and secreting them in his own locker. He was often undressing and dressing at unsuitable hours; would get out of bed in the night and sit by the fire. On one occasion he tried to pull another patient out of bed; and at midnight he would think it was time to get up. He also had some delusions of a grand character. Thus, after a bath he asserted that he had been swimming for miles. He always told his wife that he was very well, and sometimes informed her that he was as strong as a lion, and could carry a lion about if he wished. He also used to tell her that he had been purchasing various expensive things, and that he had plenty of money. About the end of May he was removed to Brookwood Asylum. I am indebted to the courtesy of Mr. Alfred Swain, Assistant Medical Officer, for particulars as to the patient's subsequent history.

He has continued to get weaker and more demented. He can still walk a little, but falls about very much. The paralysis is equal on the two sides. The pupils are also equal. The tongue is protruded straight, but is very tremulous. He has had no epileptic attacks. He appears to have hardly any ideas now, grand or otherwise. He never volunteers any remark, and scarcely does more than to mumble "Yes" or "No" when spoken to.

This patient will in all probability soon be bedridden, and his mind will become a more complete blank than it is already. How long he is likely to live, however, it would be difficult to say, as persons may linger on in this condition for a considerable time.

Looking at this case merely with regard to its symptoms and course, we should have little hesitation in pronouncing it to be one of general paralysis of the insane. In fact, it is in most respects a typical case. The point of greatest interest about it, however, is that its symptoms were so clearly brought on by, and so rapidly followed, a severe blow on the head, and it was this which at an early period of the case made it probable that the man was suffering from cerebral abscess.

Injuries of the head, however, have always been recognised as a frequent determining cause of insanity. Professor Schläger, of Vienna, quoted by Griesinger, out of 500 cases of insanity traced mental disorder to injury of the brain in forty-eight. In nineteen it came on in the course of the year after the injury, but not till much later in many others. The issue in seven cases was dementia with paralysis, while ten went on to death. In these latter there were found in different instances osseous cicatrices, adherent dura mater, opacity and serous infiltration of the membranes, more or less hydrocephalus chronicus, granulations on the lining membrane of the ventricles.¹

These, it may be observed, are just the kind of changes which are met with in general paralysis of the insane. As regards their clinical characters, however, the majority of the cases of mental disease which are caused by injury appear to be of a somewhat nondescript character, and do not readily fall under any of the ordinary varieties of insanity. The peculiarity about the case I have described is that, although traumatic in origin, it presented all the main features of general paralysis of the insane. The progressive muscular weakness, the tremulousness of the tongue, the drawling speech, the unequal pupils, the dementia, the grand ideas, all were present.

But, on the other hand, it may be asked whether abscess of the brain may not produce similar symptoms. I have not been able to meet with any case of the kind. Sir W. Gull and Dr. Sutton, recent authorities on the subject, remark—"The symptoms of abscess are usually either latent or acute. An abscess may lie latent in the brain for many months, and then acute symptoms may set in and the patient die in a few days. Local paralysis extending over several months is very rare."²

In our case, however, the symptoms were neither latent nor acute, but progressive. They commenced a few days after the accident, and have gradually progressed for fifteen months, and the man seems likely to live several months more. These facts

¹ Griesinger's 'Mental Pathology,' translated for New Sydenham Society, p. 177.

² "Abscess of the Brain," in Reynolds's 'Syst. of Medicine,' vol. ii, p. 555.

appear to me to be almost incompatible with the view that cerebral abscess is the cause of the symptoms.

But there is another point, in addition to its traumatic origin, which may be mentioned as favorable to the view that the case is one of abscess of the brain. It is that the paralysis was at first more marked on, if not entirely confined to, the side opposite to the injury. To this it may be replied that chronic inflammatory changes, such as give rise to the symptoms of general paralysis, might be easily supposed, when they followed an injury, to commence in the neighbourhood of the injured spot, and to spread thence to other parts. Moreover, in cases of this disease which do not arise from injury, the palsy may be more marked on one side than on the other. This was the case with a patient who was in the hospital in the spring of the year, suffering from general paralysis of the insane, and who has since died in an asylum. In his case the palsy was always more marked on the left side, while the tongue deviated to the right. Three days before his death he had an epileptic fit, followed by clonic contractions of the left limbs and left side of the face, which persisted up to the time of death. At the autopsy there was no lesion found which could be assigned as the cause either of the one-sidedness of the paralysis or of the convulsions. There was only some general thickening and opacity of the membranes covering the hemispheres, with undue adherence to the grey matter, and increase of fluid in the ventricles. These are the changes which are usually met with in general paralysis. But they are also, as above stated, the changes which have been found in the brains of those who have died of traumatic insanity. It is not to be wondered at, therefore, that the symptoms in the two classes of cases should be essentially similar. In Professor Schläger's cases, the symptoms are described as having been those of dementia with paralysis. In the case I have given, they were those met with in ordinary general paralysis of the insane. There is no reason why we should refuse the name because the disease was started by a physical blow, when we should readily allow it in cases where the exciting cause was a mental shock.

Whether the particular course which the symptoms took, and the form which the insanity assumed, are to be considered

as having been due to some special predisposing conditions, such as temperament, hereditary influence, and constitution, I am not prepared to say ; nor whether, on the other hand, the morbid changes which followed the blow were the necessary results of an injury of that precise degree of violence, that exact extent, and in that particular position, and would have equally occurred in any other man of the same age and general health.

2. GENERAL SPINAL PARALYSIS.

The term “*paralysie générale spinale*” was originally applied by M. Duchenne to a class of cases in which paralysis gradually invaded all the limbs, the trunk, and sometimes the muscles of the head and neck, and in which there was usually found after death no lesion of the spinal cord appreciable by the naked eye. The palsy was accompanied by marked diminution of electro-muscular contractility, and by wasting of the affected limbs, but the mental faculties remained unimpaired.

In the last edition of his work on localised electrification, M. Duchenne gives a considerably more extended account of general spinal paralysis than he did in the previous editions, and he divides the disease into two varieties. In the one he considers that the anterior grey cornua of the cord are alone affected ; in the other, the entire cord. To both varieties he gives the name of “*subacute*,” on account of the comparatively slow nature of the changes which take place, and the absence of initial fever. The first variety he distinguishes by the name “*anterior*,” the second by that of “*diffuse*.”

(A) *Subacute Anterior General Spinal Paralysis.*

This is the least severe of the two varieties, and the most frequently recovered from. It usually begins with weakness in one or other lower limb, and the paralysis progressively attacks the opposite limb, the trunk, the upper limbs, and the muscles of the head and neck. The affected muscles lose their electro-contractility and atrophy. This variety is distinguished from the other by there being no particular pain

in the back or limbs, no material diminution of cutaneous sensibility, and no bed-sores or implication of the bladder or rectum.

As I have not a complete case of this kind from the clinical practice of this hospital to offer, I think it may be worth while briefly to quote one of M. Duchenne's cases.¹

The patient was a man, *æt.* 55, who had never had venereal disease, plumbism, or rheumatism. In September, 1846, he fell and sprained his shoulder. After a while an abscess formed, followed by fever. He left the hospital in March, 1847, imperfectly cured. Some time after, he noticed a loss of power in his lower limbs; this increased, and at length he could not stand. In October, 1847, he had to take to his bed, and then he noticed that his upper limbs were also becoming weak. He was readmitted in December, 1847. There was now very little power of moving the lower limbs, and the arms were also weak. The legs had become considerably atrophied. Electro-muscular contractility was almost abolished in the lower limbs and in the muscles of the abdomen, and there was diminution of cutaneous sensibility in the legs.

By July, 1848, the upper limbs were as weak as the lower, and they had wasted considerably; but the atrophy affected the entire limb, and did not pick out special groups of muscles, as is the case in "progressive muscular atrophy." Speech had also become slow, and mastication required effort. All this time there had been no complaint of pain, no loss of appetite, no fever, no paralysis of bladder or rectum, and intelligence continued perfect. No further complications occurred, and the patient died some months later. At the autopsy no appreciable lesion of the brain or cord was discovered. Some of the paralysed muscles appeared perfectly normal, except wasted; others were yellowish, and showed fatty degeneration of their fibres.

The course of this malady is not always so regularly progressive as was the above case. Sometimes the paralysis, after having been generally distributed, disappears to a large extent, but leaving some groups of muscles permanently affected.

In other cases the palsy, having progressed to a certain

¹ 'De l'Electrisation localisée,' 3me édition, Paris, 1871, p. 461.

extent, remains stationary for an indefinite time. The following case, which occurred in this hospital recently, illustrates this point :

CASE 2.—Edward G—, a smith, æt. 29, was admitted on June 8th. He was unmarried, had been generally regular in his habits, and had not suffered from rheumatism nor worked in lead. He had a chancre some years before, but it was not followed by secondaries. His general health had been good, and there was no history of nervous diseases in the family.

He had had varicose ulcers on the left leg for three years. A vein burst about six weeks before Christmas, 1871, and he lost a lot of blood. He was laid up for a month, at the end of which time he returned to his work, but he found that he had lost power in his hands and arms, particularly the right, and that he could not grasp his hammer properly. A short time after, he noticed that his legs were becoming weak, and were apt to give way at the knees. He had been unable to work since Christmas, and was getting worse till two months before admission; since then the paralysis has been stationary.

State on admission.—The patient was a tall and well-built man, and had formerly been very muscular. His arms were still of fair size, but he said they had wasted very much. All the muscles were flabby and lax. The hands were very weak, and had almost entirely lost their power of grasping. The extensors and flexors were about equally affected. He could not support a weight of 4 lbs. on the fingers of his right hand, and could only just support that weight when placed on the palm so as to bring the flexors of the wrist as well as those of the fingers into play. He could just raise a weight of 14 lbs. hung on the right wrist, representing the power of his biceps and brachialis anticus. He could not do so much with his left arm.

By way of comparison it may be observed that a man of average muscular power can support a weight of 28 lbs. on the front of the fingers of the right hand, 48 lbs. on the palm, and 70 lbs. hung on the wrist. A blacksmith may be expected to have been capable of considerably more than this; but supposing him to have had originally only average strength, it will be seen that the flexors of his forearm had retained but one fifth of their normal power, and those of his wrist and fingers only one twelfth. The muscles of the shoulders were also considerably weakened, for he could only just raise his right hand to the top of his head, and could not do so at all with the left. There appeared to be no loss of cutaneous sensibility, but there was some feeling of numbness in the fingers, and occasionally he had slight shooting pains in the arms and hands, but nothing of any consequence.

The patient could walk fairly well on even ground, but every few yards he had to stop and rest, the legs feeling so wearied. They were apt to give way at the knees, and this had caused him to fall several times. His feet did not drag at all in walking, but they shuffled somewhat, as he could not support himself on his toes. For the same reason he could not run, and going up and down stairs gave him much trouble. The muscles of the legs were flaccid and much wasted, the right one being especially small and lax. He had no pains in the lower limbs, and there was no appreciable loss of sensibility.

There was no implication of the sphincters, no tenderness along the spine or in the course of the brachial plexus, no facial or lingual paralysis. He said that his sight was not so strong as formerly, so that he could not read for long together. Speech and deglutition were unimpaired.

The patient was treated by various tonics, and for a considerable time he was galvanized daily. When the poles of the battery were placed directly over the muscles there was little or no response, but contractions took place when the current was directed along the main nerves of the limbs.

There was no material alteration in the man's condition after two months' residence, at which time he was discharged.

Taking all the main features of this case into consideration, it certainly appears to have been one of anterior general spinal paralysis. The general distribution of the palsy, the muscular atrophy, the retention of cutaneous sensibility, the non-implication of the bladder or rectum, the absence of pains in the back or limbs, all point to this conclusion.

It is worthy of remark that, as in M. Duchenne's typical case the symptoms were preceded by an abscess which remained open for a considerable time, so in this case the man had had varicose ulcers for three years, and had shortly before the paralytic symptoms first appeared lost a considerable quantity of blood by the bursting of a vein. How far these occurrences may be looked upon as having been the determining cause of central nervous changes, it would be difficult to say. They can scarcely be considered as merely accidental antecedents, especially as it is so very common for depressing influences such as these to be the starting-point of disease of various organs, to which it is assumed that there was already a predisposition.

As already stated, in fatal cases of this disease the cord has been found to all appearances healthy, and it does not appear as yet to have been submitted to careful microscopical examination after the method of Dr. Lockhart Clarke. The fatal cases mentioned by Duchenne occurred before the introduction of this method. Nevertheless, M. Duchenne considers himself justified in definitely ascribing the symptoms to atrophy of the cells of the anterior cornua of the grey matter of the cord, and he names it in accordance with this view. The chief argument which M. Duchenne advances for this view is the close analogy which exists between the condition of the limbs in this affection, and that which occurs in atrophic para-

lysis of children and in an allied affection which he describes as occurring in adults. In these diseases, marked changes have been found in the grey matter of the cord, more particularly in the anterior cornua. Many of the cells have entirely disappeared, and others are in a process of disintegration, having lost their nuclei and their characteristic prolongations, while their contents have become granular.

Diagnosis.—(a) This variety of spinal paralysis must be distinguished from progressive muscular atrophy. The following points will effect the distinction :

Anterior Spinal Paralysis.

1. Affects in mass the muscles of a limb or segment of a limb.
2. Paralysis altogether out of proportion to the atrophy.
3. Loss of electro-muscular contractility quite out of proportion to the amount of atrophy.

Progressive Muscular Atrophy.

1. Affects particular muscles or groups of muscles, and extends irregularly.
2. No true paralysis. The weakness only proportionate to the amount of atrophy.
3. Electro-muscular contractility normal; or, rather, is diminished in exact proportion to the degeneration of muscular fibre.

(b) Lead palsy is occasionally general in its distribution, but differs from the disease we are considering in the following respects :

1. There is a history of exposure to the influence of lead, and usually of previous attacks of colic.
2. The paralysis comes on quite suddenly, and appears to affect the entire muscular system.
3. Electro-contraction is lost in a few regions only, especially in the extensors of the wrists and fingers.
4. The greater part of the paralysis disappears in general rapidly, but remains for a long time in the posterior muscles of the forearm.¹

(c) In women, hysterical paralysis would have to be excluded by the absence of the special symptoms which characterise it, and which need not be enumerated here, and by there being little or no diminution of electro-muscular contractility.

¹ Duchenne, *op. cit.*, 2nd edition, p. 316.

(B) *Sub-acute Diffuse General Spinal Paralysis.*

This second variety of general spinal palsy presents all the positive symptoms of the first, and the following in addition :—Pains, often severe, in the back, along the nerves, and in the muscular masses ; alterations in cutaneous sensibility ; contractions or rigidity of the limbs ; paralysis of the bladder and rectum ; and diminished vitality of the affected parts, as evinced by the occurrence of bed-sores.

The following I believe to be a well-marked example of this interesting disease :

CASE 3.—Fanny A—, a married woman, æt. 49, was admitted June 13th, 1872. She had had three children, but none for twenty-two years. Her general health had been good until ten months before admission, and there was no history of syphilis or of any blow or fall. At the time mentioned she had a severe choleraic attack, accompanied by vomiting, prostration, and cramps in the limbs. This illness lasted a few days, and left her weak, with a tendency to cramp-like pains in the lower extremities. The paralytic symptoms commenced, according to her own account, a few weeks after the choleraic attack, when she noticed that her legs were getting weak, and seemed to give way under her. The paralysis of the legs increased ; some time afterwards the right arm became enfeebled, and, during the two months previous to admission, the left arm. She had been subject to cramp-like pains in the back and limbs during the whole time.

State on admission.—The patient was unable to walk or stand. She could move her legs about in bed to some extent, but stiffly and with pain and effort. There appeared to be entire loss of cutaneous sensibility in the thighs, legs, and feet. Reflex movements were readily excited. The arms were very weak, the forearms being more affected than the upper arms. She could just raise her hands to her face, but the hands themselves were quite powerless, and entirely devoid of squeezing power. Sensation in the hands and forearms was much deadened. The arms and legs were extended, and somewhat stiff ; they appeared to be much wasted. She complained of frequent pains in the back and limbs, and it caused her much pain if her limbs were moved about or she were turned over on her side. She was quite unable to raise herself in bed, or to turn over without assistance. There was a good deal of tenderness over the sacral and lumbar vertebræ, and to a less extent all along the spine. The urine was occasionally passed involuntarily, and the bowels were much confined. There appeared to be no signs of mental alienation, no facial or lingual paralysis, no affection of sight or hearing, and the pupils were natural.

While in the hospital the patient became progressively weaker. During the whole time, she was subject to severe attacks of spasmodic pain in the abdomen, and to a less extent in the back and limbs. The legs became more powerless. Although generally extended in bed, they were often involuntarily drawn up or crossed one over the other. The arms and fingers were always extended. Gal-

vanism was tried for a month, without benefit. The muscles of the limbs seemed to act fairly when the current was passed through the main nerves of the limbs, but very feebly when the electricity was localised. There was no arching of the back, no stiffness or difficulty in moving the neck, no dysphagia, no facial paralysis, and no decided difficulty of speech. Her voice, however, was observed to be peculiarly harsh; sometimes deep-toned, sometimes almost squeaky. She occasionally wandered in her mind a little. The bowels were habitually constipated, and the urine dribbled away, although she could pass it voluntarily when she desired. There was an incipient bed-sore when she came into the hospital, but by careful nursing this was healed, and she was free from this complication when she went out on the 25th of August.

Further history.—After the patient had remained a short time at home, she was removed to the Greenwich Workhouse Infirmary. She gradually got weaker, and large bed-sores formed. There was increased tendency to flexion and rigidity of the limbs, and she complained much of pains, especially in the arms. She occasionally passed her motions in bed, and she continued to have the spasmodic abdominal pains. She died on the 23rd of September. I am indebted to Dr. Walker, Surgeon to the Infirmary, for these latter particulars, and also for the opportunity of being present at a post-mortem examination.

The viscera of the chest and abdomen were in a normal condition. The spinal cord and its membranes appeared to be perfectly natural. There were no signs of meningitis, and no obvious alterations of consistence in any part, as far as could be ascertained without section. The brain also appeared to be quite healthy. I took the entire cord to Dr. Lockhart Clarke, who kindly promised to prepare it for microscopical examination, and to let me have a report of its condition, if possible, in time for insertion in these reports.

The opinion of all who watched this patient was that she was suffering from chronic spinal meningitis. The pains in the back and limbs, aggravated by movement, and liable to frequent exacerbations; the tendency to contraction and rigidity of the legs, and their increased liability to reflex actions; these symptoms, together with those of paralysis, seemed to point to a chronic meningitis, with some involvement of the underlying cord, and it was with no little surprise that we found the cord and its membranes in outward appearance natural.

In the only case of which M. Duchenne gives the post-mortem appearances, and which he quotes from MM. Charcot and Joffroy, there was matting together and thickening of the dura mater and pia mater over the posterior two thirds of the circumference of the cervical enlargement. The white columns of the same region, both posterior and antero-lateral, were in a state of sclerosis. The grey matter was extensively diseased. In the posterior

cornua were found "areas of granular disintegration," an expression of Lockhart Clarke's which the authors adopt; while in the anterior cornua, many of the cells had lost their prolongations and their nuclei, and were much shrivelled. Whether any changes of this kind were present in the spinal cord of the patient whose history I have related remains to be shown.¹

The following is another case of this disease, which also occurred in the hospital a few months ago :

CASE 4.—Francis Q—, a draughtsman, æt. 40, was admitted March 30th, 1872. His previous health had been very good. He had had syphilis six or seven years ago, but no symptoms of it since. He was accustomed to take beer and spirits freely.

Six or seven weeks before admission he began to have pains in the shoulders, and subsequently in the elbows and hands. During that time both upper and lower limbs had been getting weak, and the pains had continued.

On admission.—He was unable to stand or to walk. There was no swelling or tenderness of any of the joints. The arms were very weak. The right hand was quite incapable of squeezing, and the left nearly so. He could not raise his hands to his head, nor do anything with them. The legs did not seem to be so much affected as the arms. He could move them about fairly, but could not support himself on them. He could not turn himself round in bed. In all parts of his body and limbs cutaneous sensibility was deadened, and he felt pins and needles in his hands. He complained of pains in the back and limbs. There was some difficulty in passing urine. His mental faculties were unimpaired.

Shortly after admission retention of urine occurred; but at first he objected to the use of the catheter, so that the bladder got much distended, and cystitis supervened. After this the urine was regularly drawn off, and contained blood and muco-pus. He got gradually weaker. The paralytic symptoms remained about the same. There appeared to be some stiffness of the neck, arms, and legs, and it caused him pain if they were moved about. He also suffered much from pains in the body and limbs until his death. The fæces were often passed involuntarily, and a large bed sore formed. There was no difficulty of speech or swallowing, and the mind remained clear to the last. There was no cough, and nothing to draw attention to the condition of the chest. He died on the 21st of April, nine or ten weeks from the commencement of his illness.

At the autopsy the left pleura was found to contain sixteen ounces of flaky fluid, and there were adhesions on the surface of the right lung. Both lungs were congested and œdematous.

The bladder was much inflamed, as also was the pelvis of the right kidney. The brain and spinal cord were apparently normal. There were no signs of inflammation of the membranes, nor any apparent softening or other alteration which could be detected without section. I regret to say that, owing to an unfortunate misunderstanding, the brain and cord were put aside and allowed to decompose, and so the opportunity was lost of a careful microscopical examination.

¹ See Appendix at end of this volume.

Although this case is not so fully reported as the preceding one, its course and symptoms leave little room for doubt that it may fairly be considered as coming under the head of "diffuse" general spinal paralysis. The rapidly fatal result was clearly due to complications, viz., the cystitis and the pleurisy. This latter was very latent in its character. Whether or not congestion of the lungs was due to imperfect action of the respiratory muscles, I cannot say. It has already been mentioned that there was loss of cutaneous sensibility over the body; but I do not find any note as to the character of the respiratory movements.

As regards the etiology of this interesting disease, nothing is known. It is worth remarking, however, that in the first of the two cases here narrated the paralytic symptoms were preceded by a serious depressing cause. In this instance it was a choleraic attack. Dr. Moon, of Greenwich, who was kind enough to furnish me with particulars of the patient's history previous to her admission into the hospital, informs me that more than a month before the choleraic symptoms she had complained to him of numbness and pain in her arms and hands. Whether this was an accidental coincidence, or whether it showed that spinal disease was already commencing, I cannot say. At all events it seems to have been of transient duration, for the patient did not mention it, and it was some months afterwards that there were any decided symptoms of paralysis of the arms.

Diagnosis.—The disease, and the only one, for which this affection could easily be mistaken would be chronic meningo-myelitis of general distribution. This is a disease which is probably always dependent on some injury to the spinal column, and it is especially apt to occur as a result of railway collisions and similar accidents.¹ Its symptoms are, of course, very variable, but may closely resemble those described as occurring in diffuse general spinal paralysis. There is usually, however, more marked stiffness of the body and neck, inability to turn the head without turning the whole body, and sometimes arching backward of the body. Hyperæsthesia is common. The bladder is not usually affected until a late

¹ See 'Erichsen on Railway Injuries.'

stage. There is commonly some evidence of cerebral complication, loss of memory, alterations in temper, and affection of the organs of special sense. Apart from the history, however, I believe it would be impossible to distinguish between the two diseases in every case.

3. HYSTERICAL GENERAL PARALYSIS.

The most extraordinary case of hysterical paralysis which I ever saw occurred at the Surrey Gardens Hospital some years ago, when I was Mr. Le Gros Clark's dresser. It excited great interest at the time, and with Mr. Clark's permission I will here give some account of the case.

CASE 5.—The patient was a woman, *æt.* 32, who was admitted November 27th, on account of a femoral hernia (left), with some obstruction of the bowels. The rupture had appeared fourteen days before admission, and had been caused by a fall in which the patient struck her lumbar region against a doorstep.

The day after admission she complained of some difficulty of moving the left leg and of numbness in it, and she had retention of urine. She also several times vomited blood; there was a good deal of tympanitis; and the constipation continued, so that she had all the appearance of being seriously ill.

Next day (29th) paralysis of the left leg was becoming more marked, and there was some numbness of the right leg.

On the 30th it was noted that the left lower limb was completely paralysed as regards sense and motion, and the right limb partially so. The lumbar region of the spine was found to be tender. By the evening of this day she complained of pain in the head and neck, and felt numbness and weakness of the left arm, and some numbness of the fingers of the right hand. The respirations were rapid and shallow, forty-two in a minute.

On December 1st the abdominal symptoms had been relieved by a free action of the bowels. By the evening, the left upper limb was entirely paralysed. Breathing was chiefly abdominal. I also find it especially noted that there was as yet no paralysis of speech, articulation being quite distinct. Whether any remark on the subject was made in her hearing or not I cannot remember; but I find that next day there was a decided stammer in her speech; she also spoke only in a whisper, and seemed in a very low state generally. The temperature had never been above, and was usually below the normal. The respirations remained very rapid, and the patient's speedy death was expected.

On December 3rd the impediment of speech was increased, and at 3 p.m. there was some difficulty in swallowing, although I had observed that there was none at 11 a.m.

On December 4th she complained of subjective sensations of sight and hearing in the left eye and ear respectively. Next day, she was nearly blind in the left eye, and objects seen with the right appeared many times multiplied.

On December 6th the right arm, which had remained comparatively unaffected, was becoming very weak. She was also found to be deaf in the left ear.

On December 10th the patient was in much the same condition, paralysis of all the limbs being complete. She did not appear to feel the prick of a pin on any part of her skin. The dysphagia had increased, and there was a painful catch in inspiration at frequent intervals. Articulation was more distinct than it had been, and she complained much of headache.

I need not describe any further the daily fluctuations in this patient's symptoms. Suffice it to say that, to the surprise of everybody, she still remained alive. Suspicious as to the real nature of the case then began to be felt, and the genuineness of the patient's symptoms was carefully tested, especially by Mr. W. Anderson, who was at that time house surgeon. The patient said that she was completely blind, but it was discovered by a *ruse* that she certainly could see when she was not thinking about her blindness. She was assured that firm pressure on a particular nerve would enable her to move a paralysed limb. Accordingly, when the pressure was made, "I can move it now," she said, and did so. About the 20th of December some important particulars as to the patient's antecedents were obtained through her friends. It was ascertained that, four years before, she had been confined in a lunatic asylum for ten months. Six months before admission she had had evident symptoms of hysteria, globus hystericus, laughing fits, &c., and before the present illness she had occasionally had some appearance of paralysis of the legs. It was also found that there was no truth in the tale she had told to the effect that she was the neglected and cast-off daughter of a gentleman of high position.

An œsophagus tube was now ordered to be passed regularly, and the patient to be fed through it.

Two or three days after this treatment was commenced she began to move her arms, and also to some extent recovered the power of swallowing. At the end of the year, by persuasive treatment, she had made considerable progress, could eat more, and had recovered her voice. She next recovered power in her legs, but for a long time she required the use of the catheter. By the middle of February she could get up, and on March 28th she was discharged.

It will, perhaps, be thought that the true nature of the case ought to have been detected sooner. It is proverbial how easy a riddle seems when we know the answer; and in this instance, after the real cause had been ascertained, many minor points in the case to which but little attention had been paid, or which were noted as unusual, became explained; and the whole case now seemed so intelligible that we wondered it was not more readily understood at the time. This is often so in the elucidation of complicated phenomena; and it should teach us not to attach unfair weight to symptoms which seem to bear out our views as to the nature of the case, nor to pass over as trivial or irrelevant the existence of other symptoms which do not altogether support these views.

As regards this particular patient, however, it must be remembered that she had all the appearance of being seriously ill ; that there was a history of her having struck the lumbar region of her spine a fortnight before ; and that for a considerable time the entire case was in most respects a close imitation of what may occur in rapid softening of the cord spreading upwards.

The interesting question arises whether the above case is to be considered as one of sham, or whether the paralysis was hysterical. No doubt the two are often closely associated ; but we must recognise a distinction between the malingerer pure and simple, and the hysterical malingerer. The former deliberately shams illness for a definite object. The hysterical malingerer, on the other hand, assumes or exaggerates her symptoms, not for any definite purpose, but in consequence of a certain moral perversity, or from a morbid craving for sympathy, which she can no more help than a person can help having any other form of mental aberration.

Although I believe that the patient whose case I have given wilfully assumed some of her symptoms, I do not think that she can be looked upon as a simple malingerer. As before mentioned, she had previously had symptoms of insanity, and more recently of hysteria. If she was shamming, that in itself was in her case an indication of mental alienation, for there was no adequate object to be gained by it. For several days before the stomach-tube was used she had taken no food, and she was decidedly losing flesh. She bore numerous prickings and pinchings and made no sign. No sane woman would undergo starvation, and many attendant annoyances, without some powerful motive. The only motive that we can assign in a case of this sort is that exaggerated and morbid desire for attention and sympathy which is one of the main characteristics of the hysterical condition. This may explain some of this patient's fictitious symptoms ; her blindness, her inability to speak above a whisper, her apocryphal account of her parentage ; and it is, of course, an open question whether all the complaints which hysteria simulates may not be explained in this way ; that is to say, whether the patient is not aware all the time that the symptoms are fictitious, and knowingly assumes them, in order to attract the attention and excite the

commiseration for which she craves. The weight of evidence, however, seems decidedly opposed to this view ; and I believe that in most instances the hysterical woman deceives herself as much as, or more than, she deceives other people.

In true hysterical paralysis the patient is probably as unable for the time to move the limb as if the palsy were due to a clot in her brain. A steam-engine, however perfect the machinery, does not work without steam ; and healthy limbs do not act without the motive power of the will. The hysterical paralytic seems altogether deficient in this motive power.

It is not, however, that she has no desire to move her limbs. When told to do so she tries her best. But the desire seems to be paralysed by a sort of *delusion of inability*, if one may coin the expression. In such works as 'The Life of Edward Irving' we read how these delusions have sometimes been at once dispelled by the powerful and commanding influence of a superior mind, and we saw something of the same kind in the case above related ; for the patient was successfully persuaded that she would be able to move a paralysed limb under certain conditions.

Hysteria is probably as purely a mental disorder as any form of insanity. The mental faculties are, as it were, divided against each other, and it is only when the proper relations are re-established between the emotions, the intellect, and the will, that the latter can resume its normal functions.

There have been many cases of hysterical paralysis in the wards during the past year, and in some of them its distribution was general. As, however, I find that Dr. Bristowe is writing a paper on hysterical paralysis for these Reports, I shall not pursue this subject further.

CASE OF

ANNULAR LACERATION OF THE
CERVIX UTERI

OCCURRING DURING LABOUR.

By HENRY GERVIS, M.D. LOND.

ON February 5th, 1872, I was sent for in the evening by Mr. Palmer (acting as resident accoucheur in the temporary absence of Mr. Addy) to see a case in which he feared rupture of the uterus had occurred. The following is the history of the case up to the time of my arrival:

The patient was a small woman, under five feet in height. She stated that all her labours had been very protracted, with the exception of the first, when, the birth being a twin one and the children small, the labour was comparatively easy. In her second and third confinements she was in labour for three days, and in both the placenta had to be removed by the hand. Her present, which was her fourth labour, had been in progress for twelve hours before she sent to the hospital, the reason of her delay in sending being her knowledge as to the lingering character of her previous labours.

Mr. Bennett, the obstetric clerk, who attended, found on examination the os dilated and the head still above the brim. After waiting for four hours, and the head making no progress, he sent for Mr. Palmer. Mr. Palmer finding the os well dilated and the head engaged in the brim, which was con-

tracted in its conjugate diameter by a projection of the sacral promontory, decided on using the long forceps. The head was entering the pelvis in the second position, with the forehead towards the left sacro-iliac synchondrosis. The posterior lip of the os intervened between the head and the sacrum, and was tightly nipped between the opposing bony surfaces.

Very little traction sufficed to bring the head into the pelvis, and a living male child was soon born. There was considerable subsequent hæmorrhage, so that the patient became pale and faint; and the placenta not yielding to traction Mr. Palmer introduced his hand, and found it firmly adherent to the anterior wall near the fundus. In withdrawing his hand, after detaching the placenta, he felt a loop stretching across the vagina, which gave him the idea that rupture of the uterus had taken place, and that the loop was a portion of intestine which had slipped through the rent.

I was then sent for, and on my arrival found the patient very faint, with cold extremities and a scarcely perceptible pulse. There had been no further hæmorrhage after the removal of the placenta, but the quantity lost immediately after the birth of the child had evidently been considerable. There was some but no unusual amount of abdominal tenderness, and the uterus was fairly contracted, though still rather large.

On examination my first impression momentarily coincided with Mr. Palmer's, that a rupture of the uterine wall had occurred, and that the loop felt was a portion of intestine. On tracing it up, however, no such rent could be discovered. On more accurate examination of the loop it became evident also that it was solid, and not tubular in structure; and on withdrawing a portion of it outside the vulva it was apparent that it consisted of a ring of the cervix, completely separated behind and laterally, but still retaining its connection with the uterus in front. The length of the detached loop was about ten inches, and the length of that portion of the cervix which had not separated was about two inches; there was a space, that is, of about two inches, between the points of attachment of the loop anteriorly. The breadth of the loop was from half an inch to three quarters of an inch. The question then arose as to the best method of proceeding. Taking into con-

sideration the still almost collapsed condition of the woman, the possibility that there might yet be some rent opening into the peritoneal cavity at the junction of the cervix with the vagina, although too slight to be detected by the finger, and the possibility, also, that its removal might induce some fresh hæmorrhage—a loss she evidently could ill bear—we decided on replacing it as far as possible *in situ*, and acting subsequently as circumstances might indicate. This was carefully done, the binder applied, a grain of opium ordered to be given every four hours, and beef-tea and brandy at intervals during the night.

February 6th.—Passed a fairly good night. No further hæmorrhage beyond a few very small clots. No abdominal pain. Pulse 110, temp. 100·6°.

In the evening she complained of thirst, and the tongue was furred. Pulse 112, rather wiry, but compressible; temperature 102·4°. No complaint of abdominal pain. Ordered Mist. Pot. Cit. effervesc. $\mathfrak{z}\mathfrak{j}$, 4tis horis.

February 7th.—Better, but complaining of extreme headache. Pulse 106; temp. 102·1°. To discontinue the opium pills. In the evening she was again worse, complaining of pain in the abdomen, and the uterus felt large and was tense on pressure. Tongue coated, but moist. To take Pil. Cal. c. Opio, 4tis horis.

8th.—Uterus less tense, but still some complaint of abdominal pain and general feverishness. Pulse 120; temp. 102·4°. The uterine discharges being offensive an injection of Condyl's fluid and water was used.

9th.—Better. Pulse 100; temp. 100·6°; no abdominal pain. To discontinue Pil. Cal. c. Opio. Tongue being coated and bowels not having been relieved since the confinement, she was ordered Pulv. Rhei c. Hydr. gr. xv statim. In the evening, the bowels having acted, she was still better. Pulse 100; temp. 100°.

10th.—Had a good night. No abdominal tenderness; tongue clean. Pulse 90; temp. 99·6°. In the evening, pulse 96; temp. 99·8°.

11th.—Still better. Since the 8th the vagina had been washed out with the permanganate injection three times daily; now it was thought sufficient that it should be done twice.

No very minute examination had been made up to this date of the loop, but it was now apparent on examination that it was reuniting with the cervix and had much contracted.

12th.—Scarcely any discharge and no pain.

13th.—Being weak she was ordered the *Mist. Cinch. c. Acido 3j ter die*.

15th.—Gaining strength ; discharge very slight.

21st.—Got up ; convalescent.

29th.—Examined by the speculum, the line of union between the loop of cervix and the uterus could be clearly seen ; it was complete everywhere except at one point behind, where there was a small opening through which a sound could be passed.

April 3rd.—I examined her again at the hospital with the speculum, and the opening just referred to had now quite disappeared, and a linear depression alone remained to show where the laceration had taken place.

The points of interest in this case are, firstly, its rarity, there having been but one case during the last twelve years brought before the Obstetrical Society, and that in 1860 by the late Dr. Herbert Barker, of Bedford ; and secondly, its successful issue. When, on the grounds already referred to, I decided to replace the long loop of detached cervix, I quite thought that its remaining connection with the uterus was too slight in extent to warrant any hope but that it would either slough off or require removal when the patient had rallied from her collapsed condition. Fortunately, however, its connection with the uterus, slight as it was, proved sufficient not only to maintain its vitality, but to enable it to share in the general contraction of the uterus which followed delivery, and ultimately its union with the remainder of the cervix was so complete as to be indicated merely by an annular depression. In Dr. Barker's case this accident was believed to have arisen from rigidity of the os impeding the progress of the head in a somewhat contracted pelvis ; and the child was extracted, not through the natural and still undilated os, but through the larger os produced by the circular laceration which took place. A piece of tape was tied around the detached loop of cervix, and in a day or two it came away. In this case, on the contrary, the os was well dilated, but its posterior lip was nipped between the pro-

jecting sacral promontory and the foetal head, and was thus exposed for many hours to so continuous a pressure that the tissue becoming thinned gave way with the final advance of the head, and the circular rent occurred, producing the loop in question. Had this rent taken place but a few lines higher the peritoneal surface of the uterus would probably have been ruptured, and the gravity of the case proportionately heightened. The patient does not seem to have been aware of the accident at the time of its occurrence. There was no special complaint of any sudden access of pain; but it is quite possible that it may have aided in the production of the state of collapse she was in after the delivery. Beyond a slight amount of metritis lasting for two or three days, but which speedily yielded to the treatment adopted, no symptom occurred subsequently to give anxiety.

TUBERCULAR FEVER

AND ITS

RELATION TO ENTERIC FEVER.

By JOHN HARLEY, M.D.

THE object of this communication is, in the first place, to give an account of tubercular fever; and, in the second, to show its relation to enteric fever. The subject will necessarily involve a brief consideration of the nature of both diseases.

A fair history of the origin and progress of tubercular fever will be obtained from the thirteen cases detailed in the following pages. I have found them scattered through the note-books referring to patients admitted under my care into the London Fever Hospital. Excepting one, which is clear enough, I have selected only those of which I could give a *complete* account, and these are necessarily fatal cases. In each case a clear and positive diagnosis was made during the life of the patient, and the cases were respectively designated "tubercular pneumonia," "tubercular meningitis," and "enteric fever," with or without pneumonia. I have applied the term tubercular fever to them collectively, instead of acute tuberculosis, inasmuch as this latter term implies a more chronic and less febrile condition than is exemplified in the following cases.

With regard to the second topic, the relation of tubercular and enteric fevers, the observations I have to make are I believe new, unfamiliar, and, therefore, discordant to received opinions respecting the nature of the latter disease. Medical authors,

it is true, have noted the occasional association of tubercle and enteric fever, but they have all regarded it as a rare and accidental complication, or as a sequel arising from the debility caused by a prolonged attack of the enteric disease. The evidence which I lay before the reader will, I believe, be sufficient to convince him, not only that tubercle may form an actual component of enteric fever, but that fully developed enteric fever may be solely caused by the simultaneous eruption of miliary tubercle in the intestinal glands and in the lungs.

The whole subject of enteric fever is so hedged in by narrow views as to admit of no manner of question as to its nature and cause. "It is a specific disease due to the absorption of a specific poison derived from putrescent animal or vegetable matter." Men who hold this stereotyped view will be ready to say that Case 10, for example, "furnishes no proof whatever of the absence of the proper poison; on the contrary, it is clearly there, and has, amongst other things, caused the outburst of tubercle." Well, this is the case of St. Peter's hair over again, or rather of St. Peter's no hair. You are asked to believe in the presence of the no hair, as the priest seemingly draws it out between his thumb and finger before your eyes; if your fancy is good you see it at once and clearly, but if you rely only on your gross fallible senses you see nothing, and the professor shakes his head, sighs, and tenderly laments your lack of faith. The grovelling daughter of ignorance, the cankerworm of science, preys much on medicine. As men of science we should never forget the wholesome maxim not to seek the explanation of a connected set of phenomena in more causes than one if that one be sufficient. "But is not the specific poison a sufficient cause?" my opponent will say. "No doubt, if it exists," I answer, "but I have never seen the specific poison. The turgid blood-vessels, and the masses of extruded matter lying upon them, I *have* seen, and to me *this* is the inflammation, and *here* is the efficient cause of all the attendant and consequent phenomena." Is it not so in pleurisy, in pneumonia? Why should it not be so in inflammation of the intestinal glands? Another exception arises. "The inflammatory product

in enteric fever is a *specific deposit*." Then (still referring to Case 10) we may have two kinds of specific exudation deposited simultaneously, the one in the intestinal glands, the other in the lungs or any other part. This, I think, we may fairly conclude is absurd. To grant, then, that the cause and symptoms of enteric fever are occasionally due to tubercular deposit is to set aside the notion that tuberculosis and one variety at least of enteric fever are specifically distinct.

I have long advocated more comprehensive views of the nature of enteric fever, and have insisted that it may arise in any simple inflammatory condition of the body (particularly pneumonia) as soon as the inflammatory action involves the glands of the ileum or colon, and I have shown¹ that this disease is a natural pathological sequence of scarlatina. Case 5 illustrates this sequence, but here the enteritis has assumed the tubercular form.

Nor can the so-called tubercular diathesis be properly regarded as anything more than the result of a greater delicacy of the tissues, or less retentive power of the capillary blood-vessels. The difference, for example, between simple and tubercular pneumonia is merely one of degree. The deposit is excessively fine in the former case, coarse in the latter, and a careful observer will find every intermediate degree in different individuals, and often find it impossible to say whether in a given case the deposit be tubercle or simple exudation. In the robust subject the effusion of coagulable matter is moderate, and lies close upon the outside of the vessels from which it was parted, and within the influence of the absorbent function; and thus upon arrest of the inflammation it may be removed. But it is otherwise with the delicate subject, the frame of tender build; the effusion is poured out more abundantly, and at once forms masses lying indeed upon the blood-vessels, on one side, but too far separated from them on the other to be within the influence of absorbent action. Hence, too, the difference in the pulmonary symptoms in the two cases. In the simple or molecular form as I would call it, of pneumonia the crepitation is excessively fine; while in the granular or tubercular form, coarse crepitant râles are the characteristic sounds. If the

¹ "The Pathology of Scarlatina and the Relation between Scarlet and Enteric Fevers," 'Medico-Chirurg. Trans.,' vol. lv.

lung break down in both cases, the process in the one is rapid, in the other chronic; in the one the expectoration is a thin purulent fluid, in the other it is thick and nummular. But here again variation of constitution produces a corresponding variation in the symptoms. Nature has imposed no limits between simple and tubercular inflammation. The highest powers of the microscope fail to show any difference between recent tubercular deposit and that resulting from simple inflammation. How unreal, then, is the old-fashioned but persistent distinction! Even the few cases I bring together in this communication disprove it over and over again. Are not Cases 12 and 13 capital instances of tubercular meningitis? and yet the solid exudation in the brain did not in either case take the form of tubercle. Not only may recent molecular exudation and old tubercular deposit be observed in remote parts of the same lung, but recent miliary tubercle and the molecular deposit of simple pneumonia may sometimes be continuously traced, by the naked eye, as well as by the microscope, the one into the other.¹ While microscopists quibble about the characters and transformations of tubercular deposit, the physician must avoid being misled by the confusion they create, and hold steadily to the simple teachings of nature.

In defining the association of lung and bowel inflammation in several of the following cases, I have used the term *pneumonenteritis* to denote this condition. It is a term which might be very usefully employed to reclaim a vast number of

¹ At one time of life the blood-vessels may be more retentive than at another, and a person who in early life has had limited tubercular disease of the lungs may subsequently die of molecular pneumonia. Thus John Maskall, æt. 10, after a short illness died of pneumonenteritis. The body was well developed and fairly nourished, but the bones of the lower extremity were slightly curved; the *left lung* weighed ten ounces, it was engorged and friable, being in a condition nearly approaching to red hepatization; in the apex there were several separate masses of old yellow tubercle the size of peas. The *right lung* weighed twelve ounces, it was bound to the chest by firm old adhesions. The lower and middle lobes were adherent and in state of red hepatization, sinking in water, very friable, and the broken surface having the very fine granular appearance of ordinary pneumonia. The upper lobe was in a less advanced stage of the same condition and free from a trace of tubercular deposit. *Peyer's patches* were slightly swollen and congested, and the solitary glands were in a state of psorentery, the lower ones approaching the ulcerative stage. See also Case 9.

cases of enteric fever from the category of specific disease, by referring them to a simple inflammatory action resulting, like ordinary pneumonia, and Cases 1 and 10 narrated below, from exposure to cold.

CASE 1.—*Acute general tuberculosis ; death from exhaustion on the fortieth day ; gallstones.*

Susan King, æt. 40, complexion dark, hair abundant and grizzled, admitted on the thirtieth day of her illness, which commenced with weakness and a violent cold, followed by diarrhœa and fever.

31st day.—Pulse 108; skin moist and hot; bowels inactive; respiration 28. Occasional cough and copious clear frothy expectoration. The chest was resonant, but there was coarse crepitation in the lower lobes of both lungs. At times she was delirious.

32nd day.—Bowels acted once; the stool was formed, and of a bright gamboge colour.

33rd day.—Three loose stools. Delirious and refused to answer. Crepitation extended over the back of the chest.

She continued to get worse, becoming drowsy and apathetic. The pulse varied from 100 to 116; the tongue became dry and brown; and although the abdomen was collapsed, there was persistent diarrhœa, the stools being pale and watery and on the

39th day the watery stools were passed involuntarily. She lay on her back, and there was twitching of the lips. The pupils were equal, moderately dilated, and sensible to variations of light. There was no appreciable dullness of the chest, but there was diffuse coarse crepitation. The pulse rose to 128 next day, when she sank and died, the diarrhœa persisting to the last.

The body was emaciated. The upper part of the *ileum* was firmly invaginated for four inches, but there was no swelling or inflammatory action whatever. *Peyer's glands* were slightly swollen and injected. The *solitary glands*, for a distance of three feet above the valve, formed white prominent elevations, a few only being red. The glandulæ of the large intestine were healthy. The ascending *colon* was vividly injected with points of ecchymosis. The *mesenteric glands* were healthy. The mesentery and mesocolon presented a number of circular black spots, with soft yellowish centres, old extravasations of blood, doubtless. The *liver* was a little fatty, and weighed three and a half pounds; the outer surface presented at intervals patches of miliary tubercle. The gall-bladder was collapsed and contained twenty small, angular, yellow gallstones.

The *spleen* was greatly enlarged, weighing fourteen and a half ounces, and was abnormally firm, but sections had a natural appearance. The *kidneys* weighed together eight and a half ounces; the cortical portions were studded with greyish-white raised tubercles, exactly resembling those of the pleura. The surfaces of the *mesentery*, and of the *peritoneum* in contact with the liver, were also strewn with miliary tubercle. The *pleural surfaces of both lungs* were rough, and appeared as if dusted with fine sago, and both organs were everywhere pervaded

with similar greyish-white miliary tubercles, which contrasted vividly with the firm, dark-red, congested tissue between them; the left weighed twenty-five ounces, it was bound behind by old adhesions; the right weighed thirty-two ounces. The bladder was distended. Excepting a slight deposit of jelly-like lymph upon the membranes covering the pons, and thence to the optic commissure, the brain and its membranes were healthy.

Here is an instance of general inflammation of the parenchymatous organs with *tubercular* effusion into the lungs, the pleuræ, the kidneys, the solitary glands of the ileum, and probably the spleen, and *molecular* (common) effusion upon the membranes at the base of the brain.

CASE 2.—*Acute tubercular pleuro-pneumonia in a scrofulous subject; death on the thirty-third day.*

Thomas Quinlan, æt. 19, admitted 13th September, 1870, on the third day of his illness, which began with pain in the chest and great weakness. The left side of the neck was seamed with old strumous cicatrices.

3rd day.—Physical signs of consolidation of the whole of the left lung, with fine crisp crepitation. Similar crepitation, but no marked dulness or bronchophony in the antero-inferior part of the right lung. Pulse 144, resp. 36. Flushing; sordes. Tongue moist, with a yellow fur.

The patient continued in much the same state until the twenty-sixth day, the bowels being rather confined, the cough slight, and expectoration of viscid mucus scanty. He lay chiefly on the right side, and although the respirations sleeping were usually 40 in the minute, he was tranquil and seemed free from all distress, and slept and spoke calmly. Latterly there was profuse sweating, and beads as large as peas constantly accumulated on the flushed face.

On the 28th day he was evidently growing weaker, the pulse being 136, resp. 44, and the temp. very high, notwithstanding the copious perspiration. The expectoration had become freer, and was partly frothy and tenacious, and partly smooth. The weakness increased without any other alteration in the condition of the patient, and he gradually sank and died on the thirty-third day.

The *left lung* was enormous; it was fully expanded and consolidated, forming a complete cast of the right chest, showing depressions corresponding to the ribs, pericardium, and diaphragm, and weighing three pounds seven ounces! It was everywhere adherent by a thick, leather-like, recent membrane. It was infiltrated with yellow tubercle, which, having completely invaded the lung-tissue and become confluent, rendered the organ almost non-vascular, and gave it a dry, marbled, red-and-white appearance. The apex had broken down into a cavity the size of an egg, and there were small tunnels in the immediate vicinity converging into the cavity.

The *right lung* was similarly adherent; it was also nearly solid, friable, and red, and presented nodules of yellow confluent tubercle here and there.

One *Peyer's patch* was slightly raised, and the mucous membrane of a portion of the ileum was so vascular as almost to bleed.

CASE 3.—Acute tubercular pneumonenteritis; suppuration of the lung; recovery.

Mary Roach, æt. 25, was admitted on the fourteenth day of her illness (22nd March, 1870), which began with rigors, pain in the back and stomach, and sickness.

16th day.—Pulse 104; skin hot; tongue moist, thickly coated with chalk-like fur. Bowels loose. Vomited a little dark bilious fluid.

18th day.—Pulse 88. Bowels still loose, and motions green and semi-solid. Had a slight cough and scanty mucopurulent expectoration. No physical signs of pulmonary disease. There was general desquamation of the cuticle, such as occurs after an ordinary attack of scarlatina.

28th day.—Continued in the same state, but some large crepitation was heard in the lower part of the right lung. The expectoration was purulent and flaky, and the loose stools were yellow.

30th day.—Sputum nummular.

Up to the 50th day her condition was unchanged. She lay in an apathetic state, apparently incapable of comprehending, and never answering the questions addressed to her. The brain was probably oppressed by slight effusion. The pulse ranged from 132 to 100, the temperature remaining high (about 103°), and the skin dry throughout. The diarrhoea was kept in moderate control by opiate enemata. There was occasional vomiting of greenish bilious fluid. The cough was troublesome, and the expectoration was abundant and purulent.

On the 52nd day she was much improved, beginning to observe what was going on around her, and answering questions. The vomiting had ceased, the febrile symptoms were diminished, and the diarrhoea was in abeyance. The dry parched tongue became moist again, and assumed the chalky-white fur which characterised it in the earlier part of her illness. The right upper lobe of the lung gave imperfect resonance and respiratory sounds, and the expiration was prolonged. The physical signs were not very marked, but, considering the character and quantity of the expectoration, it was pretty clear that the upper part of the right lung was breaking down. There was no apparent emaciation, no marked clubbing of the nails, but the hair was falling off.

No marked progress occurred until about the sixty-fourth day, when the tongue became clean, and a healthy hue returned to the face. The sputum, which had again become more consistent and nummular, now began to decrease in quantity, and when she was discharged, a fortnight afterwards, the cough and expectoration had nearly ceased, the appetite was normal, and the bowels regular.

Viewed in the light of the other cases, and with the positive evidence furnished by nummular sputum, I think it will be conceded that the diagnosis which I have given of the foregoing case is correct.¹

¹ The more diffuse suppuration of simple pneumonia, as far as my experience goes, furnishes a different sputum.

CASE 4. — *Acute tubercular pleuro-pneumonia; severe and persistent diarrhœa; slight deposit of tubercle in the ileal glands; death on the thirtieth day, the event being accelerated by epilepsy.*

Kate Newman, æt. 18, was admitted on the seventh day of a febrile attack, which began with headache, shivering, and looseness of the bowels.

7th day.—Pulse 120; skin hot and dry; tongue white and moist, but inclining to dry; respiration 30; lower lobe of right lung dull, with fine crepitation; a dry cough; bowels loose.

9th day.—Sharp pleuritic pain beneath the right nipple; bowels very loose, stools light coloured.

10th day.—Pulse 132; resp. 36; cough still dry; free perspiration.

12th day.—Crepitant râles over the whole of the right lung, very crisp at the apex; scanty mucopurulent expectoration; left lung normal. The bowels had acted once a day only during the last three days.

15th day.—Had an epileptic fit (to which she was liable) to-day.

16th day.—Signs of increasing consolidation of the right lung, crepitation becoming general in the left. Pulse 120; cheeks flushed; return of diarrhœa.

18th to 21st day.—The diarrhœa was checked to-day. Pulse 132; resp. 48; cough very troublesome, with scanty expectoration of frothy mucus.

21th day.—Tongue white and moist; temp. 103° Fahr.; much flushing. The whole of the right chest dull, with fine, dry, crepitant inspiration, most marked at the apex, and bronchial breathing, wheezing, and crepitation, in the left apex; cough short, dry, and troublesome.

25th day, 9 a.m.—Temp. 104°; 9 p.m. 103·4°.

26th day, 9 a.m.—Temp. 102·4°.

27th day, 9 a.m.—Temp. 103°, 9 p.m. 102·6°; pulse 144, thready; resp. very short, frequent. The cough was still very troublesome, and at times she now expectorated an ounce of frothy, nearly clear bronchial sputum. This began to excite vomiting, and her strength was rapidly failing. On the

30th day she was seized with another epileptic fit, which lasted ten minutes, and terminated in death. She continued bright and intelligent up to the time of this convulsive attack.

The body was slender and somewhat emaciated. *The right lung* was adherent to the chest-wall and diaphragm by new and tender dryish membrane; it weighed forty-two ounces. The whole lung was disseminated with rather coarse granules of yellow tubercle, which were separated by very short intervals of bright red, half-consolidated lung-tissue. The apex was quite solid, the tubercles being nearly confluent. *The left lung* weighed fourteen and a half ounces; it was partially adherent at both base and apex. The apex was slightly wrinkled, back and front, and beneath the puckerings were masses of fine granular tubercle. The lower lobe, particularly the posterior part, was strewn with yellow tubercle, but more sparsely than the right. *The spleen and mesenteric glands* were normal. *The small intestine* contained slimy, semifluid, gamboge-coloured faecal matter. Ex-

cepting a little yellow deposit in a few of the follicles of a Peyer's patch here and there, and a similar swelling of a few of the solitary glands, the ileum was healthy.

The brain and its membranes were healthy; the ventricular fluid was rather abundant.

Here with a strong tendency to cerebral excitement the brain escaped all inflammatory deposit.

CASE 5.—Scarlatina, followed by tubercular pneumoenteritis and suppuration of the lung; death on the thirty-eighth day.

Alice Allaway, æt. 15, admitted on the third day of an attack of scarlatina.

3rd day.—General scarlet rash; fauces and tonsils deep red and swollen; pulse 100; tongue red, clean, and moist: constipation.

4th day.—Pulse and tongue unchanged; pupils moderately dilated; rash fading; bowels open.

5th day.—Pulse 104; tongue moist; rash still present.

6th day.—Pulse 92; skin cool; tongue dry in the centre; slight sordes; slight delirium.

7th day.—Troublesome cough; respiration slightly accelerated; large crepitation over the back of the chest.

8th day.—Pulse as the two previous days, 92; tongue moist, slightly coated. The active pulmonary congestion progressed, as was evidenced by increasing dullness of the chest and frequency of the breathing. On the

14th day.—The lower two thirds of the left lung was completely dull, and tubular breathing had in great measure taken the place of the crepitant sounds. She lay on the left side; the pulse was 124 and full; the face was flushed; sordes accumulated on the teeth; the tongue was dry in the centre; the rash had disappeared, and there was much desquamation. The abdomen was moderately distended, diarrhœa set in, and the liquid stools were of a light yellow colour.

17th day.—No amelioration; pulse increased to 136; respirations to 44; tongue dry and fissured; large patches of cuticle were still separating; the abdomen was not so full, but there was gurgling on the right side and moderate diarrhœa.

20th day.—In the same condition; distressed with a harsh cough; no expectoration; pulse 144; respiration as she slept 36; face pale and pinched; bowels still loose.

For the next two days she improved considerably. During this time there was only one rather loose stool; the pulse fell from 116 to 108, the tongue was moist, and the sordes began to clear away; the cough was less severe, and she took custard.

25th day.—Worse again. Pulse 124; respiration 32; return of diarrhœa; pallor and prostration; the cough deep and powerless; lay sleeping on the left side with the eyelids a little separated. She continued in the same state for the eleven days following, the cough and diarrhœa persisting, the former being short frequent, and unattended by expectoration.

37th day.—The thin pulse was composed of 132 feeble undulations; the tongue was moist, red, and but slightly coated; there were two liquid pale evacuations; she still lay on the left side, scarcely alive, and this morning expectorated half a pint of yellow pus. The next day she died of prostration, having made, during the preceding fortnight, two or three attempts to rally.

The body was completely emaciated, the abdominal parietes being excessively thin; the pale, mottled, fatty *liver* descended to within half an inch of the navel line: it weighed forty-two ounces; there was an ounce of dark green bile in the gall-bladder. The *spleen* was pale, of normal consistence, and weighed three ounces. The *mesenteric glands* were large, dusky, soft, and leathery. The *Peyerian glands* near the valve were thickened and congested; those for some space above were congested and slightly swollen. The mucous membrane of the ileum presented patches of injection. There was general psorentery of the solitary glands in the last foot of the ileum, the glands being white, firm, and prominently raised. The *kidneys* were healthy but pale, and weighed together seven and a half ounces. The *right lung* was bound above and behind by old adhesions; it weighed fourteen and a half ounces, and was everywhere crepitant and free from deposit. The *left lung* was also firmly adherent at the side; it weighed thirty-five ounces; the apex only was free from deposit, and retained crepitaney, though but feebly; the lower part of the upper lobe was firm and excavated by small, tunnel-like, ragged cavities; the lower lobe was everywhere thickly strewn with fine granules of yellow tubercle, some of which were confluent in masses the size of a pea.

Scarlatina frequently passes into enteric fever by necessary pathological sequence, and the foregoing history is a case in point, the only difference being that in this case the deposit took the tubercular instead of the simple inflammatory form.

The one lung escaped, probably, on account of defective vascularity from previous disease. The enteric inflammation was in this case quite secondary to the pulmonary.

CASE 6.—*Acute tubercular pneumonenteritis; death on the thirteenth day from the accession of the febrile symptoms.*

Kate Gaynor, æt. 7½, admitted January 4, 1870; the members of her family are healthy except one who has some "complaint of the chest." The patient had been failing in health six weeks, and ill with fever and shortness of breath the ten days before admission.

10th day.—Great prostration. *Sordes*. Pulse 132; respirations 70. Skin dry and hot.

11th day.—The prostration was too great to make a thorough examination of the lungs, but there was diminished resonance, and diffuse coarsish dry crepitation over the whole of the back, with pleuritic sounds. Pulse 152; resp. 70.

12th day.—Decubitus on right side; pulse 160; resp. 80. Knees drawn up abdomen moderately full, painful on pressure. Bowels open, loose.

13th day.—Increased prostration and death.

The body was slightly emaciated. *The lungs* were swollen, heavy, and but slightly crepitant, the lower lobes were adherent to the chest wall by soft lymphic exudation. The texture of the lung resembled that of the adult spleen, and every portion of both lungs was thickly studded with white opaque miliary tubercle, the intervening lung tissue being engorged and of a vermilion-red colour. *The mesenteric glands* about the lower part of the ileum were enlarged and purple. A distinct deposit of yellow tubercle, the size of a pea, occurred in the mucous membrane of the *jejunum*. The lower end of the *ileum* was severely congested, the vessels being perfectly injected and turgid, there was general psorentery, the straw-coloured glands appearing like a pustular rash upon the purple mucous membrane: two feet from the valve many of the solitary glands were more diffusely swollen, purple, and ulcerated at the centre. The two *Peyerian glands* next to the valve had each two round ulcers $\frac{1}{4}$ " in diameter, the edges were red and raised, and the centres were dark and sloughy. A foot from the valve a similar ulcer occupied the centre of another Peyer's patch, which was generally inflamed and swollen. The agminated glands generally were purple and swollen and one or two almost bleeding, and at intervals as high as the first fourth of the ileum their centres were occupied by angry ulcers. *The cæcum* was greatly congested. *The spleen* weighed $3\frac{3}{4}$ ounces; in appearance it resembled the lungs, but it was more compact and the tubercular matter was in finer grains. The brain, kidneys and supra-renal organs and liver were healthy. The gall-bladder contained a moderate quantity of healthy bile.

On admission the symptoms of both pulmonary and enteric inflammation were well developed; previously there had been no diarrhœa. The tubercle was no doubt deposited in the affected organs simultaneously. The pulmonary symptoms were prominent throughout; the enteric disease was only declared three or four days before death, although during the period of its latency it had partly passed into the ulcerative stage.

CASE 7.—*Acute tubercular pneumonenteritis with symptoms of severe enteric fever; pneumonia on the eighteenth day; cessation of the enteric symptoms on the thirty-second day; extension of the pulmonary disease with suppuration; death from asthenia on the sixty-third day.*

Isabella Beaver, æt. 19, admitted 11th August, 1870, on the sixth day of a febrile attack of which no satisfactory history could be obtained.

6th day.—Pulse 116; tongue white and moist; skin hot and pallid; one rose spot on the abdomen, and there had been two liquid light ochre-coloured stools during the previous twelve hours.

8th day.—The patient was in a listless state, with the eyes wide open, and occasionally delirious. No answer could be obtained from her, and she held fluids a long time in her mouth before she attempted to swallow them. Pulse 120,

9th day.—The nape having been effectually blistered, she exhibited more intelligence to-day, but the diarrhoea continued.

10th day.—Twice had considerable hæmorrhage from the bowel, and this recurred on the eleventh day when the pulse was 144; the tongue yellow and moist, and the general condition and appearance of the patient was much improved.

13th day.—Pulse 132, respiration 32; which led to an examination of the chest; the respiratory murmur, however, was still normal. There were six liquid stools during the previous twenty-four hours, but the hæmorrhage had finally ceased.

15th day.—The diarrhoea continued profuse; the cheeks were flushed, and there was muscular tremor and great restlessness. Crepitant râles were now heard over the back of both lungs, and there was occasional cough, but no expectoration. The pulse 132, the respirations 32.

On the nineteenth day there was scanty expectoration of frothy mucus, and on the twenty-first day the expectoration was free, otherwise she remained in the same critical state, the diarrhoea still persisting, and the respiration being 36. She continued in the same state, with a pulse of 132, during the next week, but on the twenty-seventh day there was decided improvement, the bowels which had been moved three times the previous twenty-four hours were now quiet. She slept comfortably under the influence of twenty grains of chloral hydrate, and the respirations while sleeping were reduced to 24. The expectoration was purulent.

37th day.—The diarrhoea having now ceased for several days, and the patient being generally much improved, she was allowed fish diet. Constipation followed, the abdomen being dull and retracted, and on the forty-seventh and four following days, simple enemata were given, and each brought away a stool composed of brown fluid and numerous scybala.

On the 51st day the motion consisted of dark-brown slimy faeces destitute of scybala; the pulse was 128, respiration about 30, the skin cool; the patient looked bright and clear, but she was greatly emaciated, and was much troubled by a hard cough attended with free expectoration of mucopurulent matter. The chest was now dull behind and over the left front, and the respiration was bronchial. Although the appetite was good, the pulse was small and feeble, and the emaciation continued. She was now contending with the suppuration of the lungs, and resembled a patient in the last stage of phthisis.

On the 60th day she was much worse from failure of heart force. She rallied, however, and on the sixty-second day the thready pulse was 120, the respiration 30; the tongue was clean and dryish, the cough loose, and the expectoration opaque, purulent, and smooth. The next day, however, she relapsed and, having gradually sunk, died on the sixty-fifth day.

The body was completely emaciated. The apex of the *right lung* was strewn with sago-like grains of tubercle. The apex of the *left lung* was excavated into a ragged cavity, invading the whole upper third of the lung, the contiguous portions being riddled and tunneled with purulent passages. The lower two thirds of this lung were quite solid, the semihepatized red tissue being crowded and mottled with grains of yellowish tubercle the size of a millet seed. The intestines were greatly attenuated. The *peritoneum* was quite healthy, excepting that

there were three or four little rounded masses of solid lymph upon the lower third of the *ileum*, and these corresponded to ulcerations which had passed through all the coats of the bowels, and thus extravasation was prevented. The lower third of the *ileum* was very thin and fragile; all the *Peyerian glands* were occupied by depressed, ashy-looking, smooth ulcers, about the size of a shilling; they were all in an advanced state of cicatrization, but the edges of some were raw with fine red granulations.

In this patient the deposit of tubercle in the lungs was declared on the thirteenth day, when the enteric inflammation was at its height, and very soon the pneumonic symptoms superseded the enteric. This is precisely what occurs so often in the worst cases of enteric fever, and but for the post-mortem examination of the body, or I should rather say of the lungs, the present case would have been regarded as typical of enteric fever, attended with pneumonia.

CASE 8.—Acute tubercular meningitis and pneumoenteritis, with ulceration of Peyer's patches; death on the eleventh day from the supervention of febrile symptoms, probably the fourteenth or twenty-first of the disease.

Marian Snow, æt. $3\frac{1}{2}$, admitted on the fifth day of a febrile attack.

5th day.—Pulse 120; tongue moist, with a white fur; skin hot; cheeks with a deep circumscribed blush; drowsiness.

6th day.—Pulse 84; temp. 99.6° ; was still drowsy; pupils equal, $\frac{1}{3}$ ".

7th day.—Pulse 84; skin cool; had a more lively expression and protruded the tongue when asked to do so; it was moist and only slightly coated.

8th day.—Not so well; pulse 116; drowsiness increased; cheeks with a patchy flush; drank badly; inequality, but free mobility of the pupils.

10th day.—In a semicomatose state, with the eyes half closed; pulse 120; pupils equal; skin hot and cheeks flushed; refused to swallow. The bowels had acted naturally throughout, and to-day the motion was solid, but it was passed involuntarily. The little patient sank the next day. The body was *well developed and fairly nourished*. The brain, excepting the upper part of the cerebral lobes, was unduly soft, and there was more than the normal amount of fluid in the ventricles. The arachnoid lying between the cerebrum and cerebellum, and, in a less degree, the choroid plexuses, were studded with small white tubercles a little larger than pin's heads. The *left lung* and pleura were healthy; the visceral layer of the *right pleura* was studded with white tubercles the size of hemp seed; the *lung* itself weighed five ounces and was bound by old adhesions behind. The upper lobe was healthy; the middle was adherent to the other two by old adhesions, and it was stuffed internally with sago-like grains of tubercle; the lower lobe was in the same condition, and contained just within its anterior margin a hard round

mass of caseous tubercle the size of a marble. One of the bronchial glands had undergone a similar degeneration, and the cheesy matter was enveloped in a semi-cartilaginous capsule. The *mesenteric glands* were pale and large, and those about the junction of the large and small intestines formed a heavy knotted mass. A few small nodules of formed bright yellow faeces were washed from the bowels. The whole of *Peyer's patches* were injected and swollen, those in the lowermost part of the ileum formed cockcomb-like processes; the rest were more or less ulcerated, and many of the ulcers appeared to be in process of healing. A large Peyerian gland three feet from the valve had several small rounded ulcers, and one of them had penetrated to the peritoneum, and caused inflammatory adhesion of the part to a contiguous coil of intestine. The other organs were healthy.

This case illustrates the not uncommon fact that there may be serious ulceration, even to impending perforation of the ileal glands, without any appreciable indication of this condition. The lung and bowel mischief had probably been latent for two or three weeks; decided febrile symptoms appeared to have arisen at the time when the brain became implicated in the general tubercular deposit.

CASE 9.—Acute pneumonenteritis in a tubercular subject; death on the twenty-ninth day, chiefly from peritonitis, caused by one of the intestinal ulcers.

John Cash, æt. 14, admitted 28th June, 1870, on the twenty-first day of his illness, which, for the first nineteen days, amounted to nothing more than sickness after meals, headache, and languor, but the last two days there had been profuse diarrhœa and delirium.

22nd day.—Pulse 130. Tongue dry and wrinkled at the centre. Bowels still loose. One or two doubtful rose spots.

23rd day.—Pulse 110. Active congestion of the lower lobes of the lungs. Bowels very loose.

24th day.—Pulse 114, respiration 36. Occasional dry cough. Right chest dull in front. Fine crepitation and bronchial breathing over the whole of the lung. Two loose stools.

25th day.—Pulse 136, resp. 38. Fine crepitation over the upper half of the left lung in front. Delirium, sordes, and diarrhœa.

During the next four days the pulmonary inflammation and prostration increased. There was no expectoration, and the bowels were open once a day, and on the twenty-seventh day the stool was reported "natural." The pulse ultimately rose to 156, and the respirations to 60, and he died on the twenty-ninth day. One or two fresh rose spots appeared at intervals.

The body was rather fat and the frame large. The *right lung* was bound to the chest by very strong old adhesions in front, and by slight ones at the apex and

behind. It was in the first stage of molecular pneumonia, and only faintly crepitant. The apex was wrinkled by pea-like masses of old tubercle, lying near the surface, and surrounded by tough, carnified lung-tissue. The apex of the *left lung* was shrivelled, puckered, and knotty, obviously having been the seat of a tubercular cavity. The rest of the lung was healthy, but the lower part was engorged. There was severe peritonitis arising from a vascular spot upon the *ileum*, nine inches from the cæcum. There were rather hard masses of bright ochre-coloured faeces in both large and small intestines. *Peyer's patches*, for the most part, were gravely ulcerated throughout the ileum. The ulcers were red and angry looking, not much raised, and usually invaded only a part of the gland tissue in an irregular manner, so as to leave islands and processes of unaffected gland structure, which had the shaven-beard appearance. One of the ulcers lay on the peritoneum and caused the peritonitis, which glued the pelvic coils of intestine together, and covered them with solid granular lymph and pus. The solitary glands near the valve formed yellow elevations. The *mesenteric glands* were greatly enlarged and very vascular. The *spleen* weighed four ounces, and the *gall-bladder* contained a little thin, orange-coloured bile.

CASE 10 — *Acute and very severe tubercular pneumonenteritis ; typical symptoms of enteric fever from first to last ; death from prostration on the twentieth day.*

Charity Garner, æt. 15, admitted on the eighth day (February 1st, 1870) of a febrile attack, which began with a severe chill and loss of appetite, followed by diarrhœa. She had been remarkably healthy previously.

8th day.—Pulse 116; skin hot and dry. Tongue moist at the edges, dry, red, and cracked in the centre. Face flushed. Eight or nine rose spots on the abdomen. Bowels loose.

9th day.—A few fresh spots. Three loose dark-coloured stools.

10th day.—Pulse 104; moisture on the wrists. Three fresh spots. Four loose ochre-coloured stools. A little sordes and delirium.

The disease progressed during the following days, the rash coming out each day. The abdomen became full, painful, and tender, and she was reduced to a typhoid¹ condition.

On the 19th day there was extreme prostration and apathy, the pulse was 160, the tympanitic distension of the abdomen was increased, and the motions were frequent and watery. She died next day.

The body was finely developed, and there was a layer of fat on the abdomen three quarters of an inch thick.

The *large intestine* was healthy. The *ileum* was severely congested, and the last twenty-six inches was the seat of intense inflammation, all the *glands*, *agminate* and *solitary*, being in a state of ragged ulceration, some with grey or black sloughs, but the majority were stained yellow; the edges of the widely spread ulcers were dusky purple, almost bleeding, and raised a quarter of an inch above

¹ The author uses this term instead of "typhoid," which should now become obsolete.

the mucous membrane. One ulcer lay on the peritoneum; above this, Peyer's patches were but slightly congested, but the whole of the solitary glandulæ were as large as hemp-seeds, very turgid, and of a vivid purple-red colour. Still higher up the solitary glands were in a state of simple psorentery, forming white prominences in the mucous membrane. The corresponding *mesenteric glands* were purple, and as large as walnuts. The *spleen* weighed twelve ounces; it was of normal consistence.

The *liver* was large, doughy, and greasy, weighing four pounds seven and a half ounces. The gall-bladder contained two drachms of watery, yellowish-brown bile. The *kidneys* were large, weighing together seventeen ounces; they were congested, but otherwise appeared healthy. There was only one *ovary*, which was healthy, and double of the normal size.

The *lungs* were of the consistence and dark-purple colour of the spleen, and the lower lobes were thickly strewn with fine grains of greyish-white, tubercular deposit, which gave to the sections a very marked mottled appearance. The contiguous parts of the superior lobes partook of this condition, but the deposit gradually disappeared above, and was absent from the summits, which were merely in a state of active red engorgement, and still retained some crepitaney. The bronchial glands were dark purple and greatly enlarged.

The *pleura* were healthy, but, as the tubercular deposit could be felt through the membrane, the surfaces of the lungs were granular to the touch.

The *heart* and *brain* were healthy.

In this patient the intestinal lesions were absolutely typical of the worst forms of enteric fever, and the lungs as absolutely typical of tuberculosis.

The only pulmonary symptom throughout was hurried breathing, such as is commonly called nervous. The patient was in too critical a condition to bear the disturbance which an examination of the back of the chest required.

The so-called nervous breathing in enteric fever is usually dependent upon active pulmonary congestion, as is exemplified in this case.

It may be assumed that both bowel and lung mischief arose simultaneously on the day when the patient took cold.

CASE 11.—*Acute tubercular meningitis and pneumonenteritis; death from meningeal inflammation on the twentieth day.*

Emily Chaffers, æt. 11, admitted 18th April, 1870. She was a healthy lively child before her illness, which began suddenly with rigors followed by severe vomiting and purging.

8th day.—Pulse 92; skin hot and dry; tongue white and moist.

9th day.—Pulse 108, one liquid light-coloured stool. Abdominal tenderness.

11th day.—Pulse 102; no action of the bowels for thirty-six hours; vomited a little green bilious fluid.

16th day.—Pulse 112; tongue moist and slightly furred. Slight ptosis and external strabismus on the right side; return of vomiting. Abdomen collapsed; bowels confined.

17th day.—Wandering and moaning almost constantly, and when aroused complained of pain in the head and arms; conjunctiva much injected; persistence of right ptosis, and wide dilatation ($\frac{1}{3}$ ") and insensibility of the right pupil. A simple enema was followed by a natural stool.

The nape and subsequently the shaven head were blistered, but she gradually grew worse and died on the 20th day. Two days before her death the left pupil was contracted and active, the next day the pupils were equally dilated and fixed, she was semi-comatose, occasionally crying out with pain in the head. The previously constipated bowels were again loose, and both faeces and urine were passed involuntarily; the body was moderately well nourished. *Under the right parietal bone* for an area of three square inches there was a deposit of miliary tubercle in the white lymphic arachnoid; great venous congestion of the brain; and distension of the ventricles with clear fluid. At the base of the brain, from the optic commissure to the pons, the nerves were surrounded by a thick matting of lymph, and the third of the right side seemed to be constricted by a cord of firmer texture than the rest. There was a limited deposit of tubercle in the summits of *both lungs*; in one the deposit was partly cretified. The *spleen* and *mesenteric glands* were moderately swollen, the intestines were empty, *Peyer's patches* were generally congested, and two or three of those on the lower part of the ileum were the seat of small, round, pale ulcers.

Very many cases of enteric fever begin thus suddenly, probably from severe chill. The vomiting and diarrhoea at the outset, no doubt, marked the deposit of tubercle in the ileal glands, and just as pneumonia sometimes supersedes the enteric symptoms, so in this patient did the indication of brain mischief take the precedence, and during the latter half of the illness the meningeal inflammation appeared to be the sole affection.

CASE 12.—*Scarlatina (?) followed by acute tubercular meningitis and pneumonia; death from effusion into the cavities of the brain on the 33rd day.*

Wesley Bartlett, æt. 6, admitted on the 30th day of a fever of which no history could be obtained, but the father died this day.

30th day.—Pulse 100; skin hot and dry, with slight desquamation and faint injection over the trunk and extremities. Face pale. Tongue moist with a thick yellowish fur. Abdomen retracted; one rather loose light-coloured stool. Some noisy delirium and restlessness.

31st day.—Pulse 108; the next day 156; occasional screaming. To-day the left eyelid became tumid and drooping with wide dilatation of the pupil, which was, however, directed forwards. Tongue dry, clean, and red.

32nd day.—Pulse 110; Resp. 20, sighing and irregular, sometimes an interval of five seconds between the inspirations, which were accompanied by a sucking sound. Sibilant and subcrepitant râles heard all over the chest: an occasional cough. Retention of urine.

The little patient died comatose on the following day. The body was much emaciated; the urinary bladder was distended with healthy urine.

The meninges were severely congested; tough solid lymph was effused at the base of the brain between the crura cerebri, involving the 3rd nerve of both sides; the effusion thinned away over the pons and medulla; the ventricles were distended with clear pale serum.

The lungs were fully inflated, each weighed 8 ounces and each was speckled with miliary tubercle, the intervening lung substance being dark red. The *pleura*, the *spleen*, the *mesenteric glands* were quite healthy. A firm white clot occupied the cavities of the right heart. *Peyer's patches* were slightly red and swollen here and there.

No doubt the inflammatory products in the brain were identical in character with those in the lungs, and as these were in the form of miliary tubercles, so we must conclude that the meningitis was tubercular. Indeed, the symptoms and post-mortem appearances are those of the majority of cases of tubercular meningitis.

CASE 13.—*Acute tubercular meningitis and pleuro-pneumon-enteritis; death on the twenty-third day from effusion into the cavities of the brain.*

Henry Manning, æt. 11, admitted Dec. 20th, 1866, on the 22nd day of his illness, which commenced with fever and diarrhoea, and afterwards presented the ordinary symptoms of enteric fever; latterly there had been much delirium.

22nd day.—Was quite unconscious and tossed the head about continually; the eyes were closed and the pupils dilated, the left one more so and fixed. The pulse was rapid and almost imperceptible; the tongue moist and covered with a thick fur; the temperature high; the abdomen flaccid and the bowels quiet. The patient sank and died the following day. The body was spare but well developed. The membranes at the base of the brain were severely inflamed and a layer of toughish yellow lymph covered over the pons and the parts in front as far as the optic commissure; the ventricles were distended with yellow serum. The brain was congested and the left optic thalamus decidedly swollen, but the substance throughout appeared healthy. The *pericardium* was full of fluid, but the surfaces were quite smooth. The lungs weighed 29 ounces; both were everywhere adherent by friable organizing membranes; the apices were solidified by greyish-yellow,

tubercular deposit the size of hemp seeds; the lower lobes of both were engorged red, and tough. *The liver* was attached to the under surface of the diaphragm by new adhesions similar to those between the pleura; it was healthy and weighed 29 ounces. *The gall bladder* contained half an ounce of thick healthy bile. *The spleen and mesenteric glands* were purple and swollen. The pale intestines contained formed healthy fæces. Several *Peyer's patches* in the last four feet of the ileum were red and swollen, and several more in an angry state of ulceration; the ulcers were dark purple, raised and with irregularly contracting edges. The patches about the valve formed one continuous surface of ulceration.

In this case, again, the meningeal exudation was molecular and not tubercular.

I conclude with a few words as to the relative frequency with which the inflammatory products assume the tubercular and molecular forms respectively in enteric fever. In cases 1, 5, 6, 7, 8, 9, 10 and 11, above described, the symptoms were those of the worst forms of enteric fever, and during life the cases were regarded as such. In the interval of their occurrence 307 cases of enteric fever came under my care. Of these 51, or about 17 per cent., died. Of the fatal cases I made 43 post-mortem examinations, and 8 of these, or 18·7 per cent., were the cases above referred to. But inasmuch as tubercular, exudation is necessarily more fatal than the molecular form, this is too high a number, and in reference to the whole number of cases of enteric fever it would probably fall to less than half. Still it is a very noteworthy fact that 8 or even 5 per cent. of ordinary cases of enteric fever may be associated with the deposit of tubercle.

Since our prognosis will be affected to a certain extent by the form of the deposit, it becomes a matter of practical importance to determine whether it is assuming the tubercular or molecular form.

When the ileal glands alone are affected the distinction between tubercular and enteric fevers is absolutely *nil*, but there is usually more or less pulmonary complication; then a diffuse noisy crepitation in a considerable portion of a lung is to me a mark of tubercular deposit. Thus during life as well as after death the distinction will generally be carried back to that which subsists between tubercular and simple pneumonia. For further observations on this topic I must refer the reader to my article on enteric fever in 'Reynolds' System of Medicine.'

ON
SUBASTRAGALOID DISLOCATION OF
THE FOOT.

BY
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IT is obvious from the deeply placed situation of the astragalus, almost completely surrounded by bones and tendons, that nothing short of great violence is capable of dislodging it. Nevertheless, it is from time to time separated from one or all its connections, and has been actually driven right out of the body and found lying loose on the ground near the subject of the injury.

Great confusion has subsisted in respect of the nomenclature of dislocation of the astragalus and foot. The same kind of injury has been described in terms exactly opposite by different surgeons. The composite character of the ankle-joint, the fact that the astragalus articulates with four distinct bones, from any or all of which it may be separated, renders an exact anatomical arrangement difficult.

A simple classification, like that suggested by Broca, will, I think, best meet the difficulties that have been created. There are, in fact, three great divisions of injury in the region of the ankle. In the first place, there is the tibio-tarsal, or dislocation at the ankle-joint itself. This form of displacement involves the upper surface of the astragalus, and by some has been called dislocation of the astragalus. It is clearly not accurate to do so, as the astragalus and the rest of the foot remain one integral whole.

The next class is the subastragaloid. Here the foot is dislocated from beneath the astragalus at the astragalo-scapoid and astragalo-calcanean joints, hence the name, whilst the superior articulating surface of the bone remains locked in the tibio-fibular mortise. The displacement may be inward, outward, or backward.

Lastly, the astragalus may be separated from all its connections, and in that case only have we what is properly called dislocation of the astragalus. This form of dislocation may take place in almost every direction, but in some more frequently than in others.

Moreover, in addition to these, the astragalus has been found rotated as well on its horizontal as on its vertical axis, that is, turned upside down, or with the head directed backward in place of forward.

It is foreign to my purpose to discuss all these forms of injury, I only wish to refer to the subastragaloid dislocation of the foot. I think it is by no means so rare as most surgeons suppose. Indeed, the possibility of its occurrence was at one time doubted. One of the most recent surgical authors considers the dislocation of the astragalus itself as much more common. "I have seen," he says, "several such, but only one of the subastragaloid variety."¹

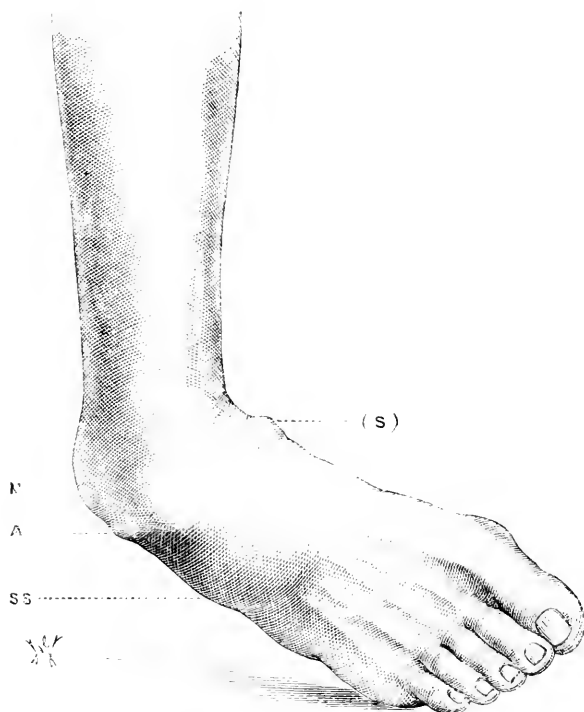
I shall now briefly furnish some particulars of four cases of subastragaloid dislocation of the foot inwards which I have had the opportunity of observing. All four were very similar in character. In each the deformity of the foot varied slightly in degree, but the salient features were precisely alike in all. The comparison together of four examples of the same variety of a rare form of injury, cannot fail to be instructive, and may possibly help a little to render the nature of the accident more easy of detection in future, and save it from being confounded with what it is not, dislocation of the astragalus properly so called.

CASE 1.—The subject of the injury, represented in the woodcuts, was a fine-looking young man, æt. 25, a stone-mason by trade. In the course of his daily employment he tumbled from a ladder and fell about ten feet to the ground. His fall was partially arrested by his right foot getting caught in the ladder rungs.

¹ 'Practice of Surgery.' Bryant, 1872.

The whole momentum of the body was thus suddenly received by the foot, which was violently intwisted. He sustained no other injury. I saw the patient immediately after the accident. The deformity appeared so striking that I took a cast of the foot before making any attempt at reduction, and it is from this the woodcuts have been drawn.

FIG. 1.



Front view of cast of subastragaloid dislocation inwards of the foot.
The leg is in the erect position.

The prominence caused by the head of the astragalus is very apparent on the front of the ankle. It has not been lettered. A, edge of the large posterior articulating facet of astragalus; M, external malleolus; s, projection caused by scaphoid bone; ss, swelling of soft parts on dorsum of foot produced by the injury.

The nature of the deformity is admirably shown in Figs. 1 and 2. The case is a typical instance of subastragaloid luxation. The foot is completely separated from the astragalus at the astragalo-scaphoid and astragalo-calcaneal joints, while the pulley of the astragalus still remains between the malleoli.

As I saw the man so soon after he had been hurt the swelling was but trifling, and I could very clearly make out the relations of the different parts.

The foot was violently intwisted and adducted, its position being like that of talipes varus. The sole of the foot looked inwards and was nearly vertical, the outer edge of the foot, with the patient erect, would rest partially upon the ground. The great toe pointed towards the arch of the opposite foot. The inner border of the foot was somewhat shortened and more concave, while the outer was more convex than natural, and appeared as if lengthened. The outer malleolus was very prominent, while the inner could not be perceived, so deeply was it buried. Neither malleolus was fractured, and this would seem to be almost characteristic of this form of injury.

FIG. 2.



Posterior view of the same cast. The way the inner malleolus is buried in the soft parts is well seen, and also the complete manner in which the calcis and the rest of the foot have been pulled away from beneath the astragalus. On the inner and upper side of the cast, the scaphoid forms a distinctly seen prominence. On the outer side the relation of the external malleolus to the articulating facet of the astragalus is easily perceived.

The rounded head of the astragalus, completely dislodged from the scaphoid, was resting subcutaneously over the calcaneo-cuboid articulation. The prominence caused by the head is somewhat masked by swelling of the soft part just below it. The skin covering the head was so tensely stretched that it seemed ready to burst, and a circular slough subsequently formed at the spot. The outline of the head could, however, be easily traced, and the finger on being passed upwards beneath the external malleolus, readily felt the cartilaginous surface of the large posterior articulating facet of the astragalus. Most of it was quite subcutaneous, and its external margin rendered the skin very tense. The interosseous ligament had been ruptured. The tuberosity of the scaphoid stood out prominently, and a depression could be felt behind it. The motions of the foot were very limited. One could slightly flex and extend the ankle, and farther adduct the foot, but not move it in the slightest towards its natural position. A reference to Fig. 3 will help to explain this to a large extent. In this drawing the bones of the foot have been

placed in the position it was supposed they were forced into by the dislocation just described. I believe it exactly represents the nature of the injury.

The patient having been chloroformed, and the knee and thigh flexed, the foot, partially extended, was then steadily pulled upon, with one hand on the heel and the other on the instep, while the displaced head was manipulated in order to push it back into its place. After a second and prolonged effort the bone slipped into its socket with an audible snap. The extension seemed at first to produce little or no effect in lessening the deformity, which persisted until it suddenly disappeared with the return of the foot to its natural form.

FIG. 3.



Skeleton of a foot, in which the bones have been placed in the position they assume in subastragaloid dislocation inwards.

This has been drawn with great care from a well-developed foot. The figure will serve as a key to Fig. 1. It requires no further explanation.

The patient's complete recovery was not interrupted by any accident. In less than a month the superficial sore, caused

by the sloughing, had cicatrised, and the unimpaired usefulness of the foot was restored.

The two succeeding cases are examples of a precisely similar kind of injury, simple subastragaloid luxation of the foot inwards. But in both instances repeated attempts failed to effect reduction, the soft parts sloughed, so tensely were they stretched over the head of the astragalus, and the secondary extraction of that bone was performed some time after.

CASE II is that of a man, æt. 45, who had been very intemperate. Whilst at his work as a plasterer the scaffold on which he stood tumbled to the ground, a distance of some thirty feet. His left foot became entangled in the planking during his fall, and he stated that he felt a forcible blow on its outer side. On examination a precisely similar deformity existed to that in the last case. The foot was completely adducted, but not quite so much inverted as in the other. A prominent swelling caused by the external malleolus and the head of the astragalus occupied the outer side and front of the ankle. The skin over these was very tense. The malleoli were intact. Professor Gordon, who first saw the patient, tried unsuccessfully to replace the foot after the patient was chloroformed; but this and subsequent attempts to reduce the deformity produced no effect whatever. The foot and leg were then laid on an outside splint.

Although every care was taken to prevent it, the skin soon gave way over the prominent part of the astragalus, and the head of the bone protruded through the opening.

Severe constitutional disturbance supervened, numerous abscesses formed around the joint, furnishing a profuse foetid discharge. The ankle-joint itself became full of pus.

It soon was clear that the astragalus was simply acting as a foreign body, and a little more than a month after the receipt of the injury the astragalus was removed with great ease, the existing opening being enlarged for the purpose. No tendons were cut. The different surfaces of the bone were eroded, and the cartilage partially removed, but it was otherwise entire. During the first month following the operation a profuse discharge of unhealthy pus continued, several other abscesses formed, and a very large one stretched half way up the inner side of the leg. From this time forward, however, the patient began to mend, his strength increased, the wounds improved in appearance, and the discharge diminished.

At the end of two months and a half he was able to go about with the assistance of a crutch. All the wounds had cicatrised with the exception of one fistulous track, and there was slight motion between the tibia and fibula, and the calcis on which they rested, fibrous ankylosis having taken place.

The difficulty in the after-treatment, apart from that which was due to the man's vitiated constitution, largely depended on the persistent tendency to inversion of the foot, which would assume, unless restrained, the position given to it by the injury.

Mr Calvert, House Surgeon to the Belfast Hospital, where this patient was treated, has been good enough to inform me of the man's present condition, up-

wards of five years after the accident. It appears from his report that "a gradual improvement took place in the appearance of the foot and in the power of progression. He now walks well, and is able to attend to his work as well as before. There is considerable flattening of the arch of the foot; and whilst walking, although he wears a high-heeled shoe, he has a considerable halt."

The next example was one which, first under the care of Mr. Clark, was afterwards transferred to me when I took temporary charge of his wards in St. Thomas's Hospital. In the nature of the injury it much resembles the last case, but the issue was, unfortunately, a fatal one.

CASE III.—William Crampton, æt. 52, a carter, of intemperate habits and bloated appearance, was admitted to the hospital on July 2nd, 1872. He had fallen off his cart astride the wheel, and also twisted his foot, but how exactly he could not describe. Probably it was caught in the spokes while the body fell downwards. The foot was found to be both adducted and inverted. In front and towards the outer side of the ankle the rounded prominence caused by the head of the astragalus was easily made out. The skin was tightly strained over it. Neither malleolus was fractured. Save that the twisting inward of the foot was not quite so pronounced, the description of the deformity in the other two cases would answer for this one, and need not, therefore, be repeated. It was, in short, a subastragaloid dislocation of the foot inward. The patient had also sustained a lacerated and contused wound of the scrotum and perineum, and suffered from scrotal hernia.

Every effort made failed to restore the symmetry of the displaced foot; the astragalus appeared locked immovably in its new position. There was, however, some power of flexion and extension of the ankle, and the body of the astragalus was clearly in its normal position between the malleoli. The limb was, therefore, adjusted in a well-padded splint, in as straight a position as possible, but the amount of deformity could be but little diminished.

The day after admission smart febrile reaction with some delirium set in. The following day the delirium became very marked, with twitching of the limbs and a high temperature. He passed, in fact, through a severe attack of delirium tremens, which was treated with doses of hydrate of chloral. Three weeks after admission the report states that the head of the astragalus had made its way through the skin.

When shortly after this the patient came under my care I found the deformity persisting, and the entire head of the bone presenting through a large ulcerated wound in front and to the outer side of the ankle. Had the patient attempted to put his foot to the ground it must have rested on its outer edge. There was not much suppuration, nor so far as could be made out was the ankle-joint involved.

It was evident that unless the foot could be restored to a more natural position the man would be permanently crippled. Two plans suggested themselves, either to enucleate the astragalus, or else to saw through the neck and merely remove the head of the bone. Uncertain as to whether the ankle-joint had been opened, or that the mere removal of the protruded head would enable me to restore the foot to its proper position, I decided that the excision of the entire bone would be the preferable course to adopt. The man's general condition now appeared satis-

factory; and accordingly I removed the astragalus seven weeks after the date of the accident without any great difficulty. I simply had to enlarge the wound on the outer side of the foot, and then I found that the connections between the astragalus and the calcis and scaphoid were completely severed, while the upper surface of the bone remained between the malleoli, the ankle-joint being perfectly sound. My suspicion was, however, verified that nothing short of complete excision would have been adequate, for even after this the foot could not at once be made thoroughly straight, and it proved a constant source of difficulty during the after treatment to resist the tendency to inversion acquired by the foot during its displacement.

In order to combat this tendency by the weight of the foot itself, and to afford free drainage for matter, the limb was laid on its outer side on a splint, bracketted opposite the wound.

During the fortnight following the operation there was some constitutional disturbance and copious purulent discharge, while the apparently inevitable abscesses formed over the inner ankle.

Subsequently the patient began to improve, healthy granulations filled the cavity of the wound, and the foot was gradually brought into the straight position.

Until the middle of October, a period of two months, Crampton got steadily better. The operation wound had then healed, and the condition of the foot was all that could be desired. Only two small abscesses which had formed over the inner malleolus somewhat delayed his convalescence, which seemed to be assured. But, unfortunately, matters not long afterwards changed for the worse, phlebitis attacked the saphena vein, and the foot and leg became much swollen. Then he had a slight rigor, followed by severe sweating fits, and the knee on the affected side became distended with pus, which Mr. Wagstaffe evacuated.

By October 22nd the patient's condition had rapidly deteriorated, erysipelatous swelling, first appearing in the leg, soon spread up to the thigh, groin, and scrotum. He fell in a typhoid state with a very rapid and feeble pulse, a tongue covered with sordes, and constant muttering delirium. The blood on examination proved full of bacteriae. For a week he remained in this plight, gradually sinking, until he died on October 31st, six weeks after the removal of the astragalus, with all the symptoms of septicæmia. No metastatic abscesses were found at the post-mortem examination, but the femoral vein was inflamed, and filled with antemortem clots as high as the profunda.

On examining the foot a new joint was found to have been partially formed, and good repair had taken place. There was fibrous connection between the ends of the tibia and fibula and the os calcis and cuboid on which they rested.

The last case I have to relate differs from the other three in being complicated by wound and also by fracture of the neck of the astragalus, but the essential nature of the injury is quite similar to that in the others. The foot was completely displaced inwards from beneath the astragalus.

CASE IV.—A labouring man, æt. 46, was admitted under my care to the Belfast Hospital. He had been a soldier for fifteen years, spending most of

his time in hot climates, was addicted to drink, and had suffered from both yellow fever and ague. He looked much older than his stated age.

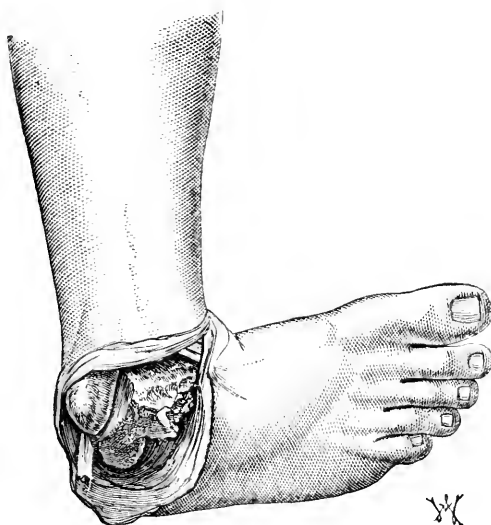
One day, driving a young horse, the animal became unmanageable and threw the driver with violence on the roadway. He fell across some logs of timber, and was able to describe how the fore part of his right foot got wedged between two of the timbers, while his body fell heavily over on the left side.

The foot was thus dragged inward from below the astragalus, which remained wedged firm between the malleoli, neither of these being broken.

Instead, however, of the head of the astragalus being dislocated from the scaphoid, as in the preceding cases, the neck of the bone gave way, fracture occurred, and the head remained undisturbed in the hollow of the scaphoid. The outer side of the ankle was occupied by an immense wound, stretching from the heel to the front of the ankle-joint, about three inches long by two and a half inches broad at the centre. The edges of this wound were tense, much bruised, and divaricated by the external malleolus and the under surface of the body of the astragalus, which partially protruded through them.

The relations of the parts is shown in the woodcut, Fig. 4. The foot was

FIG. 4.



Compound subastragaloid dislocation. In the wound are seen the body of the astragalus with part of the trochlea, and the fractured neck exposed; also the external malleolus with the middle fasciculus of the external lateral ligament attached to it. The torn soft parts are not all represented, as they would mask the positions occupied by the bones. The woodcut is therefore diagrammatic to that extent.

forcibly intwisted and adducted, and inclined at somewhat less than a right angle with the axis of the leg. It was impossible to mistake the nature of the injury, which was a subastragaloid dislocation of the foot in an exaggerated degree. In the wound the most prominent objects were the external malleolus, the front of the astragalus with its fractured surface of bone, and the larger articulating facet on the under surface, which is not visible in the woodcut. The thin posterior margin was fractured owing to the forcible adduction of the foot. From the tip of the fibula was hanging loosely the middle fasciculus of the external lateral ligament, and to its extremity was attached the portion of os calcis into which it is inserted. In the anterior angle of the wound the extensor tendons were partially exposed, while the peronei tendons were tensely stretched across it behind.

Although the patient's antecedents were not the most favorable I determined to excise the body of the astragalus and try to save the limb.

The alternatives were amputation or reduction. The former I considered unnecessary, and the latter I thought could not be ultimately successful, since the astragalus, after fracture of the neck, is deprived of its main supply of blood, and the injury having otherwise been very violent, the chances were much in favour of necrosis taking place.

After chloroform had been given the lateral ligaments were divided, and a few strokes of the scalpel sufficed to detach the body of the astragalus. I did not interfere with the head, which could not have been removed without great difficulty, and at the risk of inflicting further injury.

It was very striking to observe the forcible manner in which the muscles drew the foot up against the tibia the moment it was replaced, so that it was found very troublesome to extract the few loose pieces broken off the posterior edge of the astragalus. After the wound was dressed the limb was carefully adjusted in side and back splints and swung in a cradle, taking care that the foot and leg were at right angles. Afterwards the lateral position, with the leg and thigh fully flexed and resting on their outer side, was adopted.

Five days later the margins of the wound were found to have sloughed for a depth of half an inch all round, proving pretty clearly the violence the stretched soft tissues and skin had sustained.

Abscesses, which would appear to be inevitable in these cases, formed on the side of the limb opposite the injury.

On the tenth day symptoms of blood-poisoning were manifest. A jaundiced skin, sunken face, profound depression, a rapid intermittent pulse, subsultus tendinum, and copious sweatings, without rigors, made one despair of the man's recovery. The pus discharged from the wound was fetid, and mixed with gas bubbles. Injections of chloride of zinc into the wound cavity, plenty of wine and as much nourishment as he could take, enabled the patient to battle successfully against the septicæmia, and he soon began rapidly to improve. At the end of seven weeks the splints were removed. The wound had been filled up with healthy granulations, and was reduced to a small area.

The after progress of the case was much marred by one untoward accident. A large abscess formed stretching up the sheath of the peronei muscles. This was attended by three or four rigors, each lasting the best part of an hour, and each followed by profuse sweating. The pulse rose high, and again intermitted. The foot and ankle became swollen and sodden. Altogether the man was much exhausted by pain, irritation, and the profuse discharge. Three abscesses required to be opened in

the foot, and free openings were made in the long purulent track occupying the lower three fourths of the outer side of the fibula.

Twelve weeks after the injury the patient was, nevertheless, able to rise, the left foot being supported on a cushion. His recovery now proceeded without interruption, and he left the hospital sixteen weeks after admission. At that time the original wound had contracted to the size of a sixpenny piece, and the discharge was very slight. The foot and ankle were still a little swollen, but firm ankylosis had taken place at the ankle, and the patient could already bear some weight upon his foot.

I have seen this man many times since. He perfectly recovered the use of his leg. Between the calcis and tibia there is bony ankylosis, the foot is quite straight, the toes pointing slightly downwards. There is an inch of shortening. With the aid of a properly made boot this man can pursue his daily avocations, and earn his bread as well as before. He can walk long distances without inconvenience. At the present moment is alive and well, and will for the remainder of his days enjoy the use and benefit of the foot which was so happily preserved.

Observations.—I have now described four examples of a precisely similar type of injury of somewhat rare occurrence, and desire to record a few notes in respect of it. As I have mentioned in the beginning of this paper, I consider the simplest classification of luxations in the region of the ankle is into—

1. Tibio-tarsal dislocation.
2. Subastragaloid dislocation.
3. Dislocation proper, or enucleation, of the astragalus.

I believe that when the foot is violently twisted outward the joint most likely to give way is the tibio-tarsal, and that, therefore, in this variety we find the ankle displaced inward, and accompanied inevitably in the complete form by fracture of the fibula. The shallow depth of the internal malleolus probably favours the occurrence of dislocation of the ankle inward, while the great strength of the astragalo-scaphoid ligaments on the inner border of the foot very effectually resists any tendency of the head of the astragalus to abandon in that direction the articulation with the scaphoid. But when the violence applied to the foot is such as to invert and adduct it, experience has shown that the malleoli very often do not yield, the body of the astragalus then remains locked in the tibio-fibular mortise, and when the force is sufficient the subastragaloid form of dislocation is most likely to be produced. The head of the

astragalus is first forced from the scaphoid, and then the interosseous ligament gives way, either in whole or in part; or, in certain cases, the neck of the bone may be fractured, leaving the head *in situ*.

On examining the record of a considerable number of cases, I find the great majority of subastragaloid dislocations are of this form, and are doubtless produced in this way. The lateral, accompanied by slight displacement backward, is by far the most common dislocation. Broca is of opinion that subastragaloid luxation of the foot outwards is the more common. I believe the converse to be true.

Whether internal or external, there is in the lateral subastragaloid dislocation, in addition to the lateral displacement of the foot, generally more or less displacement backwards, for the head of the astragalus either gets locked over the edge of the scaphoid or rests on the articulation of the calcis with the cuboid, or the cuboid itself, or it may even reach as far forward as the fifth metatarsal bone. Sometimes the posterior edge of the astragalus gets impacted, as it were, in the deep groove on the upper surface of the calcis, and reduction has thus been interfered with most efficiently. It is rare, but occasionally the foot is dislocated directly backwards.

The pathology of complete dislocation of the astragalus I do not now purpose considering.

There can be no doubt that the proper way to treat all displacements of the astragalus without wound, whether partial or complete, is to endeavour, under chloroform, to restore the dislocated parts to their natural position, and to remove the deformity of the foot. The thigh should be flexed at right angles to the trunk, and the leg at a right angle to the thigh, to relax the muscles, when long-continued steady traction on the foot in front and the heel behind, with simultaneous pressure on the head of the astragalus, will often prove successful. If not, the tendo Achilles, or the anterior and posterior tibial tendons may be divided, as Mr. Pollock forcibly pointed out, 'Medico-Chirurgical Transactions,' vol. xlii. But experience has also shown that reduction cannot be effected in a large proportion of cases. Many eminent surgeons are even of opinion that when the astragalus is completely dislocated reduction should not be attempted, as it must, they urge, be

followed by necrosis, but Boyer's remarkable case and several others not less striking, establish that even after a complete dislocation reduction may be followed by unimpaired usefulness of the limb, while in ninety cases of complete luxation collected by Broca and Dubreuil reduction was successfully effected in twenty-four instances.

If reduction cannot be accomplished there is not much doubt, I think, that the wiser course is to await the progress of events. The immediate extirpation of the bone has proved in these cases very serious, while the secondary removal is attended by little danger. Broca has placed on record twenty-five cases of secondary resection of the astragalus for simple dislocation which could not be reduced. Twenty-four did well; in the twenty-fifth the patient recovered after amputation, which subsequently proved necessary.

In a few instances a tolerably useful but deformed foot has been the result of simple expectant treatment. But, generally, the stretched soft parts slough, suppuration and constitutional disturbance set in, the head of the bone is exposed, and to relieve the patient, and restore the foot to a useful position, it becomes needful to excise the astragalus.

When, either in the first instance the dislocation is compound, or becomes so by reason of sloughing, the abundant and protracted suppuration, which often ensues, proves a very grave complication. It invades the leg and foot, and stretches along the muscular sheaths and tendons, exhausts the patient, and exposes him to all the chances of septic infection.

In compound dislocations, if the injury to the astragalus be not too extensive, reduction should be attempted. But if the injury be serious, or the bone cannot be replaced, it should immediately be excised.

The statistics of dislocation of the astragalus, as furnished by M. Broca to the Société de Chirurgie at its meeting May 9, 1860, may be interesting if quoted *in extenso*, since, in respect of pathological importance, of probable effect on the patient, and of treatment, complete dislocation of the astragalus, and subastragaloid luxation of the foot, may be considered very much in the same category.

Broca collected 78 cases of simple dislocation of the

astragalus; of these 59 were irreducible, while 19 were reduced. In the irreducible cases arthrotomy was practised twice with success.

Twice immediate extraction was performed, once successfully and once followed by death.

The secondary removal of the astragalus was performed twenty-five times, twenty-four times successfully, and in one instance amputation proved necessary.

Eighty cases are recorded of compound dislocation.

Reduction was accomplished 14 times. Of these, 9 patients recovered perfectly well. Two of the other 5 recovered after the secondary extraction of the astragalus, and three died.

Reduction was impossible in 68 cases. Two of these sank shortly after the injury. Of 5 primary amputations performed, 2 recovered. The immediate resection of the astragalus gave in 57 cases, 41 cases of recovery, and 16 deaths. Consecutive resection of the head was twice successfully resorted to.

The wound in one case cicatrised over the bony prominence of the head which had been laid bare by ulceration, reduction not having been effected. The patient recovered.

It appears that M. Broca has collected 160 cases in all:—

Complete removal of the astragalus was performed 86 times with 17 deaths. Primary excision was performed 59 times with 17 deaths. Secondary excision was performed 27 times without a death.

In those cases where the neck of the bone is broken the body should be removed, and the head left undisturbed. There need be no apprehension of necrosis, as it is amply supplied with blood. It is, besides, difficult to remove. A distinguished surgeon failed in one instance in the attempt to excise the broken head, in a case similar to Case IV, and the patient subsequently died pyæmic.

The most desirable result that can follow excision of the astragalus is ankylosis of the foot to the leg, and the treatment should aim at procuring this. If the two be not firmly soldered together the foot does not offer a sufficiently solid support to the body. Besides, when ankylosis has occurred the amount of increased movement in the other joints of the foot largely compensates for the stiffness at the ankle. Mr. Holden mentioned to me the facts of a case of injury similar

in most respects to Cases II and III, where he had excised the astragalus. The patient recovered with a beautiful and symmetrical foot, to the great satisfaction of the surgeon. But no ankylosis took place, and the foot moved sufficiently freely in every direction at the ankle completely to prevent the patient using it for walking. The consequence was that he returned after a time to the hospital to implore Mr. Holden to amputate his useless foot.

Ankylosis is, however, so common a result after extirpation of the astragalus that Boyer considered it an inevitable one, and Heyfelder states that out of sixty-seven cases he collected, only in ten was any mention made of a moveable joint. In all cases it is necessary to devote great care to keeping the foot in proper position. When excision has been performed for recent injury, or a dislocation has been reduced at once, there is little difficulty, but in cases where the deformity produced by the injury has already subsisted for some time there is often great trouble experienced in removing it, and overcoming the tendency the foot has to resume the position given to it by the accident. In this, as in many other things, the best apparatus is the watchful solicitude of the surgeon.

I have not considered the propriety of amputation advanced by a few surgeons as the most suitable way to treat dislocation of the astragalus, as some rather vaguely call it. It cannot, I think, be justifiable to amputate for either simple or compound dislocation of the astragalus, unless some additional lesion be present sufficiently serious to render it necessary. Whether this be so or not must be determined in each particular instance according to those general principles which are accepted for other forms of injury. Probably in most cases where it is needful to amputate Syme's, Pirogoff's, or even Dupuytren's subastragaloid operation could be performed with advantage.

In the French Academy of Surgery M. Chassaignac maintained, in 1860, the necessity for amputation of the leg in these cases. But for an injury of the foot amputation of the foot should, if possible, be performed, and there is no contra-indication to this maxim in ordinary subastragaloid dislocation any more than in dislocation of the astragalus itself.

It is, perhaps, only within the last twenty years that the nature of subastragaloid dislocation of the foot has been fully recognised. Nélaton was one of the first to point it out in a case of Roux's, under the name of incomplete dislocation of the astragalus. Authors have frequently described cases of subastragaloid dislocation as being luxations of the astragalus properly so called. Sir Astley Cooper, for instance, has certainly done so. In the edition of his treatise on 'Dislocations and Fractures,' published in 1842, by Bransby Cooper, chap. viii treats of dislocations of the foot. The case first mentioned is described as a dislocation of the astragalus, but the woodcut given of it would answer perfectly for a dislocation of the foot below the astragalus.

If Case 193 in the same chapter be read attentively it will be evident that the injury there described as dislocation of the astragalus inwards is a subastragaloid dislocation of the foot outwards, which Mr. Cline, under whose care it was, reduced by pulling on the heel and metatarsus, the thigh being bent, and, by pressing his knee at the same time against the dislocated joint, "the os calcis and navicular bones," he says, "slipped into their place, carrying with them the rest of the foot, and the deformity disappeared." Indeed, in the octavo edition of the same book, published in 1826, Mr. Green specially remarks of this very case, "the os calcis with the rest of the foot was thrown outwards."

The next case (194), also under the care of Mr. Cline, is described to Sir Astley by Mr. Green as a compound luxation of the tarsal bones, "in which the astragalus was thrown outwards, or, in other words, *the other tarsal bones dislocated inwards from it*. The foot was turned considerably inwards; the articular surface on the head of the astragalus, which is received into the cup of the navicular bone, was exposed through an extensive but tolerably clean cut through the integuments, and the articulating surface of the os calcis with the astragalus might be perceived on the outer side."

The case is nothing else than a subastragaloid dislocation of the foot inwards, similar to that represented in Fig. 4, and described in Case IV. The accident was occasioned by the fall of a heavy stone, which struck the patient's heel. Reduction was effected as in the former case, and a tedious but complete

recovery ensued. Curiously enough, it would seem that Case 200, reported by Mr. South to Sir Astley Cooper, is the very same case (194) described by Mr. Green. In his report Mr. South mentions that in the wound, which extended around the outer side of the joint, "the articulating surface of the astragalus with the navicular bone was exposed on the fore part, as well as that with the os calcis on the outer side, from both of which bones the astragalus was displaced. *Its connection with the tibia and fibula was, however, undisturbed.*"

This double description completely establishes the case as one of compound subastragaloid dislocation, and the identity of Mr. Green's and Mr. South's accounts can be verified by comparing the two records as given in the older editions. The first history calls the injury a dislocation outwards of the astragalus, in the second it is classified under the medio-tarsal luxations, where the five anterior bones of the tarsus are supposed to be dislocated from the os calcis and astragalus.

In the 'Bulletin de la Société de Chirurgie,' p. 293, 1860, two cases are reported by M. Chassaignac as occurring in his service at the Hôpital Lariboisière. They are styled irreducible luxation of the astragalus upside down (*sens dessus dessous*); but why they should be so called I am quite at a loss to understand.

In the report by M. Servain, M. Chassaignac's interne, the following details are given:—A man, æt. 30, was riding on the top of a waggon of coal, when coming into collision with a passing vehicle, coal waggon and man were overturned together. His feet became entangled in the midst of the coal, while the body fell over on the opposite side. The right foot, powerfully thrust inward, formed an angle of 135° with the leg. On the outer side the extremity of the fibula, which was unfractured, formed a large prominence, beneath which was a marked depression. Immediately below, and a little anterior, one could feel beneath the skin a sharp, bony, horizontal ridge, two centimetres long. Two fingers' breadth in front, on the dorsal surface of the foot, was another projection, rounded, perceptible to the sight, and more especially to the touch, manifestly formed by the head of the astragalus. The ridge before mentioned moved with the head

of the astragalus, of which it evidently formed part, and represented either its superior external edge, *or more probably the inferior external border, which is sharper than the other.* On the inner side it was not possible to distinguish the malleolus, while behind the tendo Achilles was bent inwards, at the same angle as the rest of the foot. Two attempts were made to reduce the deformity, but as they consisted in forcibly extending the foot they would only lock the astragalus more firmly, and it is easy to comprehend why they were unsuccessful, and the more so as on the subsequent removal of the bone its posterior edge was found engaged in the calcanean fossa, the foot doubtless being displaced somewhat backward as well as inward. The patient made an unsatisfactory recovery.

The description of the second case is given in less detail, but sufficient is said to make it plain to me that here also we had a subastragaloid dislocation of the foot inward. The right foot assumed the position of a talipes varus. The outer border rested on the ground, and the plantar surface looked inward. The prominences on the outer and front part of the ankle stretched the skin almost to bursting. The anterior one was readily recognised as the rounded head. The posterior was thought to be the external edge of the articular pulley.

M. Chassaignac, not being able to reduce the deformity, excised the astragalus by a curvilinear incision on the outer side of the foot. The patient had sustained other severe injuries, and died exhausted a month afterwards.

I have no doubt that these two cases thus, I believe, misnamed, were quite identical to the instances I have described of subastragaloid dislocation in Cases I, II, and III. The general position and deformity of the foot, the relations of the rounded head of the bone, and especially the well-marked prominence of the bony ridge described in both cases as beneath and slightly in front of the outer malleolus, which without doubt was the external edge of the large articulating facet on the under surface of the astragalus—lead me without hesitation to identify the true nature of the injury.

How, I should like to know, could the sharp posterior margin of the astragalus become engaged in the calcanean groove, as described in the first case, were the bone turned upside down?

It would not prove difficult, were it not unnecessary, to multiply instances from various authors in which the description given of an injury apparently indicates it to be a subastragaloid dislocation, while it is called by some other name. I have quoted from Sir Astley Cooper's classical treatise to show that errors of description and diagnosis have occurred even to the most distinguished surgeons, and that there is reason to think that subastragaloid luxation of the foot, often designated by some other title, is not so rare a form of injury as is generally supposed.

Whenever the bony prominences of the astragalus preserve their natural relations to the tibia and fibula, and especially when the power of extension and flexion is not wholly lost in the ankle-joint, one may assume with certainty that a dislocation is subastragaloid rather than of the astragalus itself.

In conclusion, I wish to express my thanks to Mr. William Anderson for the admirable manner in which he executed the drawings in this paper, and for the great trouble he took in the matter.

CASES OF DYSENTERIC DIARRHŒA.

BY EDWARD CLAPTON, M.D.

DYSENTERIC diarrhœa is not altogether a correct term. It is not found in the Registrar-General's returns, nor in the 'Nomenclature of Diseases' published by the Royal College of Physicians. Yet it is a very convenient name to give to a large class of diseases which are commonly met with, in which the symptoms are of a mixed character. Even ordinary dysentery when it occurs in this country is generally associated more or less with diarrhœa, the parts chiefly involved being the upper portion of the colon and (either directly or sympathetically) the lower end of the ilium, instead of the lower part of the colon and the rectum, which are said to be the principal seats of disease in tropical regions. Nearly all the cases, however, of so-called dysenteric diarrhœa which have fallen under my notice are of a different character, and are due, in my opinion, to a specific causation and require an appropriate plan of treatment which only has any decided effect in permanently benefiting these patients.

The following have been under my care in the hospital during the last year or two :

CASE 1.—Ellen H—, æt. 38, single, having no settled home, was admitted into Florence Ward 6th September, 1871. She had suffered more or less for some years from diarrhœa of a dysenteric character. Sometimes the flux was that of ordinary diarrhœa, sometimes bloody and attended with considerable pain and straining. She had been for many years "an unfortunate," and had suffered terribly from syphilitic disease. When admitted she was found exceedingly

feeble, pale and thin; pulse small, slow and feeble. Tongue coated, patchy and sore at the edges; skin cool. There was considerable tenderness along the colon. Some of the stools were jelly-like and streaked with blood, but most of them consisted of thin faecal matter with small lumps. She was ordered a mixture of bismuth, opium, ipecacuanha and soda three times daily.

4th October.—Much better as to diarrhœa; still considerable pain of a burning character, discharge of sanguinolent mucus, and tenesmus. Ordered iodide of potassium (5 grs), rhatany, spirit of chloroform and calumba 3 times daily. This was continued until 8th November, and with very marked benefit, only that the patient still remained thin and anæmic. Chalybeate tonics and cod liver oil were then prescribed, and on 23rd December she was sufficiently well to be recommended for admission into a convalescent institution. Not succeeding, however, she was allowed to remain in the hospital for some time longer in consequence of general debility, still continuing to take cod liver oil, chalybeates, and nutritious full diet. She was then removed to Homerton Union, much improved in all respects, though still feeble and unable to get about much.

CASE 2.—Samuel J—, æt. 47, a labourer, residing at Mile End, was admitted into Edward Ward 24th March, 1871. He was a somewhat cachectic-looking man, and there were found several patches and spots of syphilitic lepra about his arms and legs. Had been labouring under diarrhœa of a dysenteric character for several months; complained especially of flatulence and tormina. Was ordered $\frac{1}{2}$ drm. of compound tincture of camphor in 1 oz. of stomachic mixture (a cold infusion of rhubarb, gentian and ginger, with carbonate of soda) three times daily. Also ointment of ammoniated mercury to the leprous patches. Mixed diet, arrowroot, and beef tea.

5th April.—Intestinal irritation and diarrhœa diminishing; lepra increasing. Ordered 4 minims each of arsenical solution and tincture of opium in 1 oz of water, twice daily directly after meals.

15th.—Improved considerably in all respects until yesterday, when without any appreciable cause the dysenteric diarrhœa returned with increased severity. To have 1½ oz. chalk mixture 3 or 4 times daily.

18th.—No improvement; much pain at night and sleeplessness. To have 5 grs. each of compound powder of ipecacuanha and extract of henbane every night.

22nd.—Diarrhœa still increasing, and attended with exceedingly painful tenesmus and almost constant griping. Occasionally passes blood as well as acrid mucus. Ordered 8 grs. iodide of potassium, and 1 drm. tincture of rhatany in 1 oz. peppermint water 3 times daily.

29th.—Has been, and still is, daily improving; dysenteric symptoms much slighter. Sleeps well at night.

10th May.—Very much better in every way.

24th.—Rash almost disappeared. Bowels open once daily only, without either looseness or constipation. Quite free from pain. Urine high coloured from bile. Has a slightly jaundiced hue. To have 3 grs. mercury with chalk every other night for 4 times.

11th June.—Perfectly well. Has considerably gained flesh the last month. Discharged cured.

CASE 3.—James S—, æt. 28, a labourer, living in the Hackney Road, was

admitted into Edward Ward 14th March 1871, suffering from an attack of dysenteric diarrhœa. He appeared on admission to be very weak and emaciated, though naturally a well-built man. Had been ill 5 months, and attributed his illness to working near a drain. At first the diarrhœa was painless, but very frequent and profuse; soon it was attended with considerable griping pain and tenesmus.

No blood had passed recently, only dirty-looking mucus and masses of indurated fæces. He was very restless, and suffered considerably from want of sleep and flatulence. Pulse small, feeble, 80. Ordered to have $2\frac{1}{2}$ grs. of mercury with chalk and 10 grs. compound powder of ipecacuanha immediately. Milk diet and beef tea. Next day a pill consisting of $2\frac{1}{2}$ grains of each of the above drugs, to be taken every other night, was prescribed, and 2 drms. castor oil on the following morning. Also one glass of brandy with arrowroot daily.

18th March.—Much the same in all respects until yesterday, when the bowels were opened once only. Pulse perhaps a little feebler. To have 4 grs. carbonate of ammonia in 1 oz. infusion of calumba three times daily. Boiled fish to be added to diet.

22nd.—Diarrhœa returning. To have $\frac{1}{2}$ drn. tincture of rhatany added to mixture.

25th.—Not so well; tongue parched and sore; skin dry; a slight lichenous rash; rapid pulse; much pain in head; very restless at night. Considerable abdominal pain before passing a motion. States that he had syphilis six months ago. Ordered 10 grs. iodide of potassium to each dose of mixture. From this time he improved rapidly in every respect. Was soon put on full diet. He then daily gained strength and went out on 6th April, having lost all trace of dysenteric diarrhœa.

CASE 4.—Charles S—, æt. 30, a porter, residing at Clapham, was admitted into Edward Ward 14th February 1871. Had been ill for upwards of twelve months, having suffered from excessive intestinal irritation, almost constant griping pain, general feverishness, gradual loss of flesh, and the passage several times daily now of liquid faecal matter, and now of sanguineous mucus with scybalous lumps. The cause of his illness could not be made out. He had never been abroad or exposed to malarious influences. For the first two and a half months of his stay in the hospital he was ordered a great variety of treatment, with varying results, but certainly without any decided benefit: such treatment consisting consecutively of alkaline aromatic tonics, chalk with astringents, ipecacuanha with quinine, and grey powder with Dover's powder at night, followed by small doses of castor oil in the morning, kino with opium, &c.

On 3rd May iodide of potassium in full doses was first ordered, and continued until 22nd June, when he was presented cured, but on account of having had so long an illness was sent direct to a convalescent institution at the seaside. The iodide of potassium was given alone in water, and from the time he began to take it he at first gradually and afterwards rapidly improved. The intestinal irritation, pain, and discharge (beyond a normal daily evacuation) quite ceased. In the first instance he denied ever having had syphilis, but on more closely questioning him subsequently it was clear that he had not only been affected with it but had been under treatment for it; and, besides, the peculiar lobulated, patchy and sore tongue, as well as the appearance of the throat, strongly pointed to this.

It will be thus seen that in each of the above cases iodide of potassium almost at once afforded relief, and after a short time brought about recovery without anything like a relapse; whereas under any medicinal treatment previously given little or no benefit ensued. I hardly think this could have been the case had not the disease in all these instances had a syphilitic origin; at least I know not in what other way the iodide can have had so decided and potent an influence in this otherwise most intractable complaint. In each instance there was an undoubted history of syphilis, and there is certainly no reason why secondary or tertiary manifestations should not occur in the colon or rectum, as well as in the throat or larynx. It is of course not so easily discovered or recognised, and for that reason, perhaps, is generally overlooked, and the disease treated as an ordinary one of modified dysentery. Taking this view of the case, it is not surprising that the result of treatment should as a general rule be so unsatisfactory. In syphilitic infants it is well known that diarrhœa of an obstinate character, with slimy sanguinolent stools, is of frequent occurrence, and there is seldom any perplexity as to the treatment of these cases, though unfortunately these infants are generally under the influence of a cachexia which gives them but little chance of recovery. Dysenteric diarrhœa has often yielded to mercurial treatment, either calomel or grey powder with Dover's powder being generally found most beneficial, and this may possibly be from the specific origin of many of these attacks. The same may be said of certain styptic enemas such as those of sulphate of copper which have been much lauded. Dr. Trousseau narrates the case of a young woman who was in the hospital under his care for an obstinate diarrhœa which had lasted thirteen months, and was complicated with lientery, gastralgia, and vomiting; and which, after resisting many medicines, ultimately yielded to mercurial treatment. This woman's diarrhœa, the cause of which he was long in discovering, was the first, indeed the only manifestation of constitutional syphilis. Dr. Trousseau states that he was led to the correct view of the case by the patient suffering from pains in her head, notably aggravated at night, and by her having tumours over both tibiae and other bones; finally a gumma, which ulcerated, on the calf of the right leg, placed beyond question

the accuracy of the diagnosis. Under appropriate mercurial treatment the diarrhœa, as well as all the other symptoms, rapidly yielded. No opportunity has been afforded by post-mortem examination of actually observing the exact condition of the intestinal mucous membrane in such cases, but it is easy to judge by analogy in respect of similar manifestations elsewhere that sometimes there is syphilitic ulceration of the lower part of the large intestine, sometimes inflammation of an erythematous character higher up. With regard to diagnosis between syphilitic and non-syphilitic dysenteric diarrhœa, the former comes on more gradually and insidiously, whereas the latter is generally ushered in by an acute attack. As a rule the history will clear up the difficulty.

The following case of dysentery, of a different nature to those already related, though bearing upon the question, was recently under my care in the hospital :

CASE 5. — William M—, æt. 26, an iron turner, residing at Battersea, was admitted into Arthur Ward 20th September, 1872.

Had been always a very healthy man until he went to Upper Egypt in August, 1871. He was there engaged in making machinery in connection with some new sugar plantations. Had an attack of syphilis soon after his arrival. In the beginning of November he was seized with acute dysentery. Attributes the cause to improper diet (notably bad water, and scarcity of vegetables), but he was working many hours a day in a shed where the temperature was 155° during the day. The nights were cold and there were heavy dews. Very few other cases of dysentery occurred at that time amongst a large number of workmen, and only two cases of decided ague.

He recovered after being laid up a month at Cairo, but there was a relapse a week after his return to work, and he was then sent to the hospital at Alexandria, whence he was presented cured after six weeks. On returning to his duties he obtained much better diet—plenty of vegetables, good bread, and better water. There was no return of dysentery until April. He then came home at once, and was attended at Battersea until his admission into the hospital, a period of five months. During this time the dysenteric symptoms fluctuated, but on the whole became decidedly more severe. Recently, too, he was seized with a severe attack of left pleurisy. His family are all healthy, and no cases of phthisis have occurred amongst them: father, mother, and ten brothers and sisters are all living and quite well. On admission he was found pale and thin; pupils very dilated; tongue dry, slightly coated, and red near the tip; appetite bad; abdomen soft and flat, but along the course of the colon there was considerable tenderness; no hepatic tenderness. He passed upwards of twenty evacuations in twenty-four hours and suffered almost constantly from tormina and tenesmus; stools jelly-like and sanguinolent; no scybala. On examining the chest there were found dulness on percussion, small crepitation and bronchial breathing under left clavicle. Urine

1030, slightly alkaline, free from albumen or sugar. Weight 8 st. Was ordered 4 grs. ipecacuanha with $\frac{1}{2}$ gr. opium, three times daily. Milk diet, arrow-root, and mutton broth or beef tea, with white of egg beaten up in it.

3rd October.—Stools less frequent and pain easier, but he is somewhat weaker and often very faint. Profuse night sweats. Ordered a quinine mixture three times daily, and 5 grs. oxide of zinc with 5 grs. extract of hemlock every night. 4 oz. brandy daily.

9th.—Much better; scarcely any pain or tenesmus; very fair nights with less sweating; four or five evacuations a day consisting of ordinary faecal excretion in a fluid state, occasionally mixed with a little blood; cough rather more troublesome and expectoration greater. Weight 8 st. 9. To have mixed diet.

16th.—Phthysical symptoms slowly increasing, otherwise improving. Loose alvine evacuations only occur directly after a meal.

23rd.—Bowels open only once or twice daily, and in a perfectly natural way. Weight 9 st. Recommended for a convalescent institution at the south coast.

It is thus seen that dysentery may assume in this country (as is often the case) a modified and more chronic character, after having attacked the patient in an acute manner in a hot climate. The case gradually drifted on to one of ordinary diarrhœa, and then a healthy state of the bowels soon followed. The man had, however, become affected with a decidedly phthysical state of the lung, to which he will doubtless succumb before long. He might have had tubercular diathesis before going to Egypt, though there is no history to show it. At all events it has been remarked by medical men who have been in the East that dysentery chiefly attacks those Europeans who had a tendency to phthisis, and who would, probably, have been affected with it in cold climates. This is one reason why deaths by consumption so rarely occur in tropical climates. It is, in fact, merely a substitution of one disease for another. It will have been observed that this patient had syphilis in Egypt not long before the attack of dysentery, but I do not think it had anything to do with bringing on the latter, for there were sufficient recognised causes independently of it, viz. hot days, cold nights, bad food, and malaria; and he was eventually cured of that disease without recourse being had to anti-syphilitic remedies; but the syphilitic attack did doubtless tend to induce relapses and keep up a chronic condition, and it also, in all probability, brought about that indurated condition of the left lung which ultimately led on to phthysical degeneration and softening.

ON THE
TREATMENT OF CICATRICES AFTER
BURNS.

By FRANCIS MASON.

IN the practice of surgery the shocking deformities occasioned by burns are comparatively rarely met with ; but when they are brought under notice for operative procedure, and are amenable to local treatment, they afford abundant scope for thoughtful consideration and skilful ingenuity on the part of the surgeon.

It would be tedious as well as unnecessary for me to refer in this place to the various methods that have from time to time been proposed to remedy the disfigurement resulting from such accidents.

My object in the present paper is to lay before the reader an account of an operation I practised in three cases with such an amount of success as to justify its repetition.

It may be incidentally mentioned that *excision of the entire cicatrix*, as originally proposed by Hildannus, and afterwards imitated by the late Mr. Earle, is practicable only in examples of very slight deformity. Again, the *simple division* of the scar, subsequently keeping the cut edges thoroughly apart by some mechanical appliance, is by no means uniformly satisfactory, the result depending so very much on the healthy condition of the subjacent areolar tissue. In most cases, and especially those in which the deeper structures are more or less involved, the best plan, in order to effect immunity from

recontraction, is to divide the cicatrix and transplant a portion of healthy skin into the wound.

Under any circumstances these deformities demand the greatest amount of care and patience, often extending over a period of months, or even years, and the good results of treatment will generally be in exact proportion to the degree of attention the surgeon bestows on each individual case.

Perhaps there is no subject on which there is a greater difference of opinion than that of the treatment of these deformities. Some surgeons altogether abandon the use of the knife; and the writer of an article on plastic surgery¹ expresses himself in these words:—"Surgical ingenuity has been pushed to the uttermost to devise operations by which this distressing calamity may be removed; but I express the opinion of most surgeons of experience of the present day in affirming that hitherto almost all such operations have proved failures; and for this simple reason, that wherever an incision is made a new cicatrix must be formed, and this new cicatrix will undergo precisely the same process of contraction as the former, which it was intended to alleviate. It may be laid down as a rule, almost without exception, *that a cicatrix should rarely be touched with the knife*" (*sic* in original).

The author concludes by recommending mechanical extension, the value of which I fully appreciate, if combined with surgical interference. Each case must, of course, be judged on its own merits; but there is abundant evidence to prove that the judicious use of the knife is, in many instances, followed by the most satisfactory results.

The operation about to be described is somewhat similar in principle to that practised for closing a fissure of the hard palate; indeed the idea of applying the principle to cicatrices suggested itself to me in considering the subject of staphyloplasty. It bears some resemblance to Dieffenbach's urethroplastic operation, and is a modification of what the French term *autoplastie par glissement*.

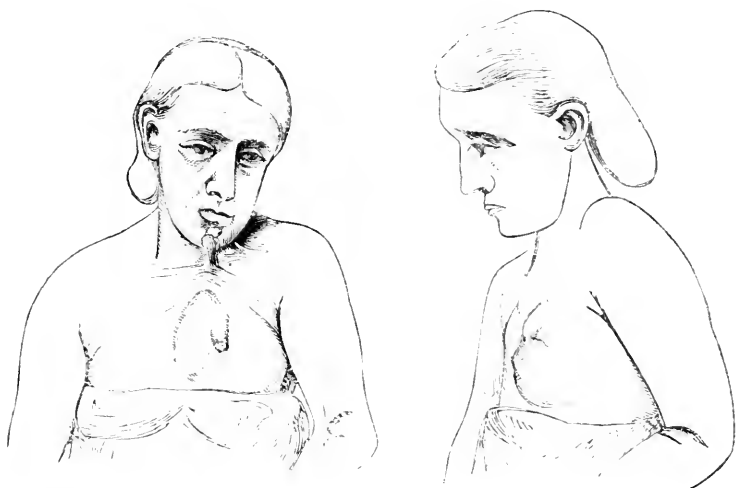
The first patient on whom I operated (August, 1870) was a girl, æt. 17, who when six years old was severely burned, especially about the neck. The accompanying engravings (Figs.

¹ Holmes' 'System of Surgery,' vol. v, p. 587, 1871, art. "Plastic Surgery."

1, 2) will give some idea of her condition before and after the operation.

FIG. 1

FIG. 2.



The chin was almost effaced and drawn down to the sternum, the two parts being connected by a broad band of cicatrix covered with delicate smooth shining cuticle. The lower jaw with the left side of the lower lip was everted, but the escape of saliva could with a slight effort be prevented. The left breast was also involved, being drawn upwards.

The second case was somewhat similar in a girl, æt. 12, but the cicatrix was not nearly so extensive. It was a thick band of sufficient strength to fix the head down to the chest.

The third case (Figs. 3 and 4) was that of a girl, æt. 14, with a cicatrix at the bend of the right elbow. (The letters in the figures indicate the bridges of skin as described below.)

In all three the following operation modified to suit each case was performed. The cicatrix was divided at the centre from side to side, the incision reaching to healthy skin at each extremity. (It should be borne in mind that the cicatrix was freely divided, *not entirely cut out.*) The two halves were then

thoroughly separated from the subjacent textures in the upward and downward direction, and the tough areolar tissue in

FIG. 3.

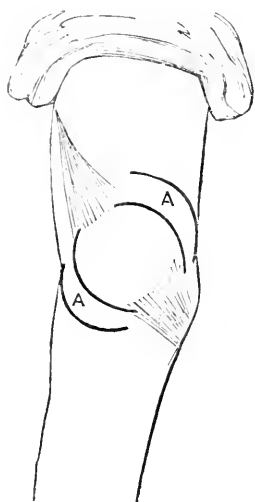
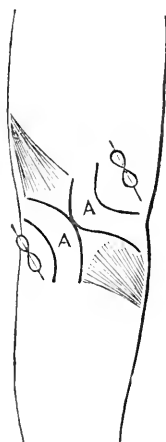
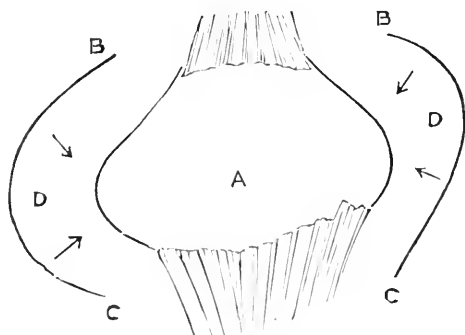


FIG. 4.



the wound notched with the knife as deeply as the important neighbouring vessels would safely permit, thus leaving an open wound (Fig. 5, A).

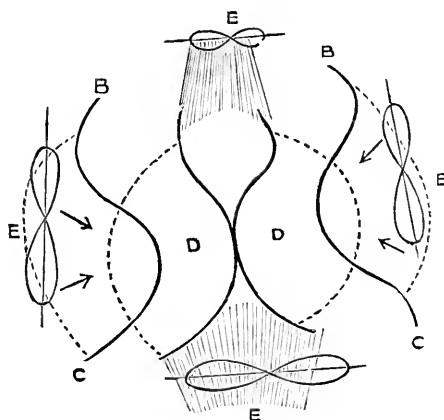
FIG. 5.



An incision was then made on each side, from B to C, and the respective flaps (D D) dissected towards the wound in the

direction of the arrows. Thus, two bridges were formed which were raised and without difficulty carried to the centre of the wound, their concavities meeting as convexities in the middle line (Fig. 6).

FIG. 6.



In this way the wound caused by the division of the cicatrix was almost completely filled by the two bridges of healthy skin, two raw surfaces of healthy tissue being left in the sites from which the bridge had been taken (Fig. 6, E E, on right and left). The edges of the flaps were united by wire sutures and a sufficient number of harelip pins, used to diminish the size of the various raw surfaces (E E E E).

By this method two important indications are fulfilled — firstly, the wound is occupied by healthy elastic and extensible skin, and, secondly, the skin being taken in the form of a bridge is necessarily attached at each extremity so that its vascularity is almost to a certainty maintained, at least the chance of its sloughing is reduced to a minimum. Moreover, its vitality is still further insured by its perfect adaptation to the subjacent raw surface.

The above description will answer sufficiently for the three cases. It is only necessary to add that the first incision, to divide the cicatrix, was made transversely in Nos. 1 and 2, and diagonally in No. 3.

In conclusion, one other point of some interest may be briefly referred to. When the first case was operated on, in August, 1870, M. Reverdin's plan of skin-grafting had been recently introduced into the country by Mr. Pollock, and in this case I tried the experiment of grafting small pieces of skin, the size of a millet seed, on the *fresh raw* surface. Twelve such pieces were taken from the patient's abdomen and distributed here and there over the wound, but the result was that not a single one adhered. As the case proceeded other small pieces were grafted on the *granulating* surfaces, but with no better result. I confess I was disappointed that the latter failed, inasmuch as the granulations were seemingly extremely healthy. The failure may, perhaps, be attributed, in some measure, to the constant movement of the part, as in swallowing, &c., and partly to the cicatricial character of the surface.

I am not aware that skin-grafting on *recently made raw surfaces* has been attempted before, and the fact is here mentioned with the view of inducing surgeons to repeat the experiment. There must be numerous cases in which the practice might be advantageously employed. M. Reverdin's plan was successful at the elbow in Case 3 during the *granulating stage*.

CASES OF EMPYEMA.

By G. H. EVANS, M.D., M.R.C.P.

I PROPOSE in this paper to give notes of eight cases of empyema which have presented themselves in this hospital during the past year, followed by a few remarks on their peculiarities and points of interest.

Of the eight cases five were tapped, and in four (including one that was tapped) pus was evacuated through the bronchi; of the four latter three progressed favorably; of one the result is doubtful; of the five former two recovered, two died, and one is still under treatment.

CASE 1.—*Pleurisy, with effusion, enlargement of glands, and thickening of ribs, probably from malignant deposit.*

William P—, æt. 62, was admitted under Dr. Bristowe on the 23rd Oct., 1871. His illness commenced two months previously with pain in the left side, followed by shortness of breath and a good deal of cough, and at first expectoration. These symptoms continued more or less up to the time of admission. He had lost flesh, and had been obliged to lie on the left side since the beginning of his illness.

On admission the following notes were taken:—There is dulness on percussion over the whole of the left side of the chest, which moves very little in respiration. The heart is displaced to the right. On the left side there is diminished vocal fremitus and very feeble respiration, loudest at the apex, diminishing downwards, not quite absent at the base behind, but totally absent in the lower third in front and laterally. He coughs a little, but does not spit. His appetite is middling. He sleeps badly. Pulse 72. Ordered Animon. Carb. gr. v. Tinct. Opii ℥v, Vini Ipec., ℥viii, Inf. Cascariellæ ʒj, 6tis horis.

The mixture was discontinued on the 28th, and a quinine mixture ordered instead.

On November 8th it was noticed that he was expectorating a small quantity of thick, brown, glairy fluid.

On December 6th two hard movable tumours, about the size of small beans, not painful or tender, were observed just under the integument in the neighbourhood of the left axilla.

December 9th.—He has not been so well during the last week or ten days. There is pain in the left side, and some tenderness in the left mammary region, where there is also some fulness. The side does not move in respiration, and is universally dull. Coarse breath sounds can be heard at the apex behind, but elsewhere there is almost total absence of respiration. The heart is still displaced to the right. The two sides of the chest are equal in circumference. His appetite is bad, and he sleeps badly.

Paracentesis was performed (with some difficulty, owing to approximation and apparent thickening of the ribs) about three inches outside and one inch below the nipple, and 30 oz. of thick, brown, glairy fluid were removed, resembling the matter which he had lately been expectorating, containing blood-corpuscles.

13th.—He was much relieved by the operation. There are now three enlarged moveable glands in the parietes of the chest. There is dulness and total absence of respiration over the whole front of the left side of the chest.

16th.—The glands in the chest wall remain; and a very distinct fulness is observed in the axillary region, a little below the level of the nipple, about the spot where the puncture was made. There is no tenderness, but the integuments are thickened, and probably the periosteum also, so that the ribs cannot well be felt; on the other side they can be felt easily.

30th.—The glands have increased in size; the left pupil is larger than the right; the veins on the left side of the neck are distended. He says he is getting thinner, but his appetite is good.

January 6th, 1872.—His general health continues much the same. The left side is quite dull all over, except at the extreme apex behind, and the outer part of the apex in front. Some respiratory sounds are heard at the apex in front and behind, and along the spine, but no sounds elsewhere. The heart is beating to the right of the sternum; the left side does not move in respiration; the surface is smooth and slightly cedematous. The periosteal swelling is now considerable.

20th.—No material change. He is much better in health since the tapping.

He left hospital on the 31st January, and went to the Convalescent Hospital at Bognor.

He was readmitted on the 4th June, 1872, having been pretty well for a month at Bognor, but since then having been unfit for work, and having lately been more troubled with shortness of breath and pain in the left side.

On readmission the right side measured $17\frac{1}{2}$ inches, the left $16\frac{1}{2}$ inches; the left side was absolutely dull all over, and no respiratory sounds whatever were audible on that side, except at the apex and along the spine behind, where there was a little tubular breathing. The ribs still seemed enlarged; there were still three enlarged glands to be felt on the left side; and the veins on that side of the neck were distended. He complained of flatulence, but had very little cough or expectoration. Ordered Mist. Quiniae c. Ferro \mathfrak{ss} , t. d.

He was again discharged, relieved, on the 8th July.

He was again admitted on October 21st, 1872, when the following notes were taken:—He has been deteriorating in health, has lost flesh, and has had pain in the left side of the chest. On examination the heart is found beating in the fifth interspace on the right side, about two inches below the nipple; the heart sounds are healthy. The left side is perfectly dull in front and behind, immoveable and smooth, measures $1\frac{1}{2}$ inch less in circumference than the right. The nodules in the axilla and below it have increased in number and size, and over the lower part of the left side in front are numerous small hard subcutaneous nodules which are recent. Feeble respiratory sounds are heard at the outer part of the left apex in front, and along the spine behind; elsewhere there is total absence of respiration on that side. His breath is rather short; he has no cough.

Paracentesis was performed about $2\frac{1}{2}$ inches below and outside the nipple, and about 40 oz. of thick, glairy, brown fluid were removed, which contained numerous large granule-corpuscles, cholesterolin, and some cells apparently epithelial. A good deal of air was admitted during the operation, and evidence of pneumothorax was obtainable for a week or ten days afterwards.

November 23rd.—A gland was removed on the 21st inst. from the side of the chest. It was hard and white, and when examined microscopically presented a large amount of dense fibrous tissue, enclosing spaces filled with large epithelium-like cells, and many lymphatic gland-corpuscles. There was some rather obstinate bleeding after the operation; and he states that he has always found it difficult to stop the bleeding when he has cut himself.

28th.—He is still in hospital, able to get about and do light work in the ward; complains of occasional pain in the left side and shortness of breath.

CASE 2.—*Empyema, pointing externally, and opening into bronchial tube; recovery.*

Mary T—, a servant, æt. 24, was admitted under Dr. Peacock on the 2nd January, 1872. There was no family history of phthisis.

She stated that she had been subject to cough and expectoration from childhood, but had been worse during the last twelve months. Five months ago she caught cold, and suffered from pain in the left side and shortness of breath. Three months ago she noticed a little blood in her sputum.

Her condition on admission was as follows:—She is pale and emaciated, and has a slight cough, with distinctly purulent sputum. Her fingers are clubbed. Tongue furred; skin warm and moist. Temperature $99^{\circ}6'$; pulse, 108, feeble; respiration 32.

The chest has somewhat fallen in beneath the clavicles, especially on the left side, where there is marked impairment of movement, dulness on percussion, and increased sense of resistance. There is somewhat large crepitation heard over the whole of the lower part of the chest in front, and rhonchus over the upper part. Voice resonance is much increased under the left clavicle, and there are imperfectly marked cavernous sounds at the left apex behind. In the left dorsal region there is marked dulness with coarse crepitation, a souffle with the cough, and a somewhat cegophonie twang with the voice. In the left lower lateral region there

is entire dulness and absence of respiration. Over the right back there is coarse crepitation and, perhaps, friction.

Ordered Mist. Cinchonæ cum Acido ζj , Tinct. Camph. eo. ζss , Tinct. Chloroformi eo. $m\bar{x}$, t. d. Pil. Ipecac. eo. gr. v, o. n. s.

January 16th.—At the left apex in front there is marked dulness, and no respiration is to be heard. There is entire dulness over the left dorsal and lateral regions, with almost total absence of respiratory sound; perhaps a little friction can be heard. Pulse 120, feeble; respirations 36, short and very irregular; temperature 99.8° . Ordered Tinct. Iodi to be applied to the left side.

30th.—The left side is considerably contracted, dull all over, with increased sense of resistance. In front a slight superficial friction sound is heard, and cough resonance is increased. On the right side there is some rhonchus, with increased vocal resonance.

February 6th.—She is better. The side is still contracting. There is very little movement of the left side; respiratory sounds are to be heard in the upper part of the left back, not in the lower dorsal and lateral regions. The breath is peculiarly offensive, with a somewhat gangrenous odour.

16th.—Ordered Ol. Morrhuæ ζj b. d.

March 1st.—The chest is much fallen in under the left clavicle, where it is absolutely dull, and very little respiration is to be heard. Posteriorly the dulness is still marked. She complains of pain at the left of the left mamma, where the skin is reddened, hard, and tender, indicating an abscess pointing. The cough is troublesome; the expectoration, though scanty, distinctly purulent. She has profuse night sweats.

The abscess was opened on the 8th March, and a large quantity of healthy pus removed; it continued to discharge for a week or ten days, during which time obvious contraction occurred above, and natural respiratory sounds became gradually audible, more or less distinctly, all over the chest, except in the lower dorsal and middle and lower lateral regions.

After about three weeks there were signs of increased accumulation in the pleural cavity; the lower part of the side became fuller, an abscess began to form in the breast and threatened to open; but the pus found its way out through the former opening. Shortly after this she commenced expectorating a considerable quantity of pus daily, and was much relieved.

April 19th.—Much better. She has a slight cough, with a little expectoration. Pulse 64; respirations full and free, 28. There is marked contraction under the left clavicle; the left shoulder droops, and the head is inclined to the left. The dulness is marked in the dorsal and entire in the lateral region, where movement is almost absent, and there is some fulness with obliteration of intercostal spaces. The heart sounds are heard and felt over a large space in front, more to the left than usual. The stomach resonance extends far into the chest. Weight 6 st. $7\frac{1}{4}$ lbs.

30th.—Respiration is perfectly audible over the whole of the upper front; dulness is still marked in the lower dorsal and lateral regions; there is some dry creaking friction over the lower part of the back; the external opening is closed.

May 10th.—Weight 7 st. $3\frac{3}{4}$ lbs. Girth below nipple, right side 15 in., left 14 in. The left side is less dull. There is more healthy respiration, and obvious pleural crackling at the angle of the left scapula, with loud bronchial sound with

cough. There is a churning sound with the heart's action to the left of the præcordia, obviously pleural.

31st.—Girth of right side 15 in., of left $13\frac{1}{2}$ in. She is gaining flesh and strength. There is still very little movement of the left side, and entire dulness at the lower part.

June 4th.—Weight 7 st. 6 lbs.

July 8th.—Weight 7 st. 10 lbs.

August 2nd.—On the whole there is improvement. Her breath is still offensive. There is crepitation behind, probably pleural. There is still very little movement of the left side. Girth of right side $15\frac{3}{4}$ in., of left $14\frac{1}{4}$ in.

October 4th.—She is much improved. There is still much difference in size and movement between the sides, the girth of the right being $14\frac{3}{4}$ in., and that of the left $13\frac{3}{4}$ in. below mammæ. There is less dulness and more vesicular breathing on the left side. In the upper lateral region friction is heard. She still has a slight cough, with some expectoration, not purulent. She has no night sweats. The temperature is normal. Weight 8 st. 1 lb.

On October 8th she left the hospital for the convalescent establishment at Walton.

On November 8th she presented herself at the hospital, and the following notes were taken of her condition:—The left side of the chest is obviously contracted, but less so than formerly. Movement also is impaired on the left side, but has decidedly increased since the last notes were taken. The dulness on percussion of the left side is much less than it was, but is still marked over the dorsal region. There is much more natural respiration at the upper part of the chest in front, laterally, and behind. Distinct friction sounds of a stretching character are heard over the lower lateral and posterior parts of the chest. The peculiar churning or whipping sound formerly heard with the action of the heart has entirely ceased. A slight whiff is still audible a little above the angle of the scapula and between that body and the spine, and there is somewhat trumpet-sounding vocal resonance in the same situation.

CASE 3.—*Pleurisy (pyæmic ?) after parturition; empyema opening into bronchial tube; recovery.*

Jane W—, a married woman, æt. 25, was admitted under Dr. Murchison on the 8th January, 1872.

Family history good. Previous health good.

She was confined eleven weeks ago; after which she went on well for a fortnight, and had begun to get about, when her present illness commenced with shivering, followed by febrile symptoms, pain in the left side, and shortness of breath; she had no cough. Her milk ceased, and she became very weak.

About three weeks ago she felt something give way in her chest, and all at once she began to spit up a great deal of pus, which at first was mixed with blood. Since then she has had a good deal of cough and purulent expectoration, but the pain in the side has ceased, except on coughing. At about the same time she noticed some pain and tenderness in the front of the left thigh.

On admission the following notes were taken:—She is extremely emaciated,

very weak, and has a small bed sore on the back. Decubitus left. The skin is hot and dry, but she perspires profusely at times, especially at night; she sleeps badly. The cough is troublesome, especially at night. She expectorates from half a pint to a pint of thin diffuent purulent sputum in the twenty-four hours. Pulse 112; respiration 48; temperature 99·8°. Tongue clean, dry; appetite good; bowels regular. Her general appearance is that of a patient with advanced pulmonary phthisis. On the right side of the chest the resonance is good, and coarse, sonorous râles are heard generally. On the left side, in front, above the heart, the resonance is too clear; the side scarcely moves at all in respiration, and at the level of the nipple is half an inch smaller in girth than the right. In front no breath sounds are heard; behind, on sitting up, there is absolute dulness over the lower half of the left lung, where no vesicular breathing is to be heard, except a little coarse respiration close to the spine; at the angle of the scapula there is well-marked amphoric breathing with metallic tinkling; no splashing is heard. The heart's sounds are heard loudest at the ensiform cartilage; the apex beat is not perceptible; a circumscribed roughness is heard with both sounds over the sternum at the level of the third cartilages. On the front of the left thigh there is a fluctuating swelling of the size of a large orange. Ordered mixed diet, milk Oij, brandy 6 oz., egg; Quin. Sulph. gr. ij, Acidi Sulph. dil. ℥xv, Tinct. Opii ℥v, Syrupi ʒj, Aquæ ʒiiss, quater die.

January 18th.—She expectorates less pus. The resonance below the left clavicle is less clear. The girth below the right breast is 15 in., below the left 13 in. The amphoric breathing and metallic tinkling are still heard, but less distinctly. There is vesicular breathing at the back along the spine. Perspirations at night still profuse.

23rd.—Zinci Oxidi gr. v, h. s. s.

February 1st.—The night perspirations have been checked since taking oxide of zinc. The abscess in the thigh was opened on the 26th of January. There is much improvement and patient is daily gaining flesh and strength. There is dulness on percussion under the left clavicle, with distant breathing. The girth is the same as before. There is more vesicular breathing heard behind, and no amphoric breathing.

8th.—The expectoration has quite ceased, the skin is cool, there is no perspiration. The two sides measure respectively 15 in. and 14 in. There is dulness over the lower third of the lung behind; above this there is fair resonance; there is a feeble vesicular murmur everywhere.

26th.—Girth of right side 14½ in., of left 14½.

March 11th.—The girth of the two sides continues the same. There is fair resonance over the upper three fourths of the lung, and the vesicular breathing is more distinct.

Discharged on the 26th March, 1872, with no cough or expectoration, and feeling quite well.

CASE 4.—Empyema opening into bronchial tube; recovery.

Thomas D—, æt. 10, was admitted under Dr. Peacock, on the 19th Feb., 1872. His father, mother, two brothers, and two sisters are living and healthy.

All the history that could be obtained of his illness amounted to this, that he

had been ill about three weeks, that his illness commenced with pain between the shoulders, but that he had no pain on admission.

The following notes were taken of his condition on admission:—The left dorsal region is more full than the right, and is markedly dull; over it is heard very loud pleural crepitation, with some indications of consolidation. On the right side there is some deficiency of resonance with slight crepitation. There is dulness under the left clavicle with pleuritic sounds and increased cough resonance. There is dulness and crepitation in the left axillary region. Tongue clean; pulse quiet; respiration short and hurried. Fingers clubbed.

Ordered Mist. Stomach. \mathfrak{z} ss, b. d., and a small blister to the left side.

March 8th.—On the 6th he got up contrary to orders, and remained at an open window for some time. On the 7th there were symptoms of fever and aggravation of the pneumonia of the left lung; the dulness on percussion was increased, and there was loud tubular breathing and increased vocal resonance. Pulse 132; respirations 36; temperature 104.2° .

Ordered Liq. Amm. Acet. \mathfrak{z} ss, Vini Ipec. \mathfrak{m} v, Tinct. Camph. Co. \mathfrak{m} x, Aquæ \mathfrak{z} ss, t. d.

He is now (8th) better. Pulse 124; respirations 32; temperature 100.5° . The left dorsal region is somewhat contracted, dull all over, with little respiratory movement. In front resonance is impaired; behind there is loud pleural crepitation over a very large space, with distinct metallic respiration; breathing is bronchial in the upper, absent in the lower axillary region.

12th.—There is very little movement of the left side, which is entirely dull. The pleural friction sounds are less distinct, and there is bronchial breathing over the whole of the upper part of the side.

Potassii Iodidi gr. ij to be added to the mixture.

April 9th.—There is some improvement. There is still marked dulness behind, with pleural crepitation and bronchial breathing; but at the left apex in front there is more resonance and more natural breathing.

The side to be painted with tincture of iodine.

23rd.—On the 19th inst., after a violent fit of coughing, he expectorated a considerable quantity of pure pus, not offensive; this had occurred, it seems, twice before, the expectoration of pus continuing each time for two or three days. Now, when he lies on the right side, there is resonance and loud amphoric breathing over the whole of the left side.

May 31st.—There has been no expectoration for some weeks. The left side is steadily contracting. There is less air in the pleura, although there is still an amphoric sound over a large space at the left back when he coughs sitting up.

After this he had one or two slight returns of purulent expectoration, but gradually improved in health. He left hospital on the 20th August, 1872, having been to all appearance in fairly good health for some time.

CASE 5.—*Empyema opening into bronchial tube.*

Harry M—, a shopman, æt. 25, was admitted under Dr. Murchison, on the 15th April, 1872.

Six months ago he was taken ill suddenly one evening with fever, sore throat

&c. He was told that he had typhoid fever, but had at no time diarrhœa, or, to his knowledge, any eruption. On the fifth day of his illness he began to suffer from acute pain in the right side, which continued more or less till the eighth week, when suddenly, after a fit of coughing, he brought up an enormous quantity of pus (he said there was nearly half a gallon). The pain was at once relieved; but he has since continued expectorating pus in gradually diminishing quantity. During the first one or two weeks the pus came up in large quantity during about two hours each day, and ceased during the rest of the day.

His condition on admission was noted as follows:—He is thin and weak; his breath is short on slight exertion; he has no sweats or rigors; he has no pain anywhere; he coughs up easily a large quantity of pus, not offensive, and also much clear bronchial secretion, altogether about half a pint daily. Tongue clean, appetite good, bowels regular, no fever, temperature at night normal. The right side of the chest is contracted and motionless (its girth being 15 in., while that of the left is 16½ in.); on this side there is no vocal fremitus, the breath sounds are distant and bronchial, the vocal resonance is distant, but rather loud. On the left side the breath sounds are exaggerated. Ordered Tinct. Ferri Perchlor. xxx ex Aquâ t. d.

He continued steadily improving during his stay in hospital. On the 16th May the two sides measured respectively 16 in. and 17½ in.; on the 6th June, 16¼ in. and 17 in.

July 1st.—Ordered Ol. Morrhi. ʒij b. d. post cibum; Quin. Sulph. gr. ij, Acidi Nitro-hydrochlor. dil. xx , Syrupi ʒj, ex Aquâ, t. d.

He was discharged relieved on the 17th July, and sent to the convalescent establishment at Bognor.

CASE 6.—*Pleurisy; empyema; hæmorrhage; death.*

John W—, a barman, æt. 21, was admitted under Dr. Bristowe, on the 9th May, 1872.

Five months ago he began to cough and expectorate, but had no pain. Four months ago he was laid up for three weeks with cough and sharp pain in the left side. The more urgent symptoms gradually subsided, but he has continued short of breath. He has lost flesh.

His condition on admission was noted as follows:—He is thin and pale; his breath is short; he has not much cough. Pulse quiet. The left side of the chest is dull all over and motionless, with entire absence of breath sounds and vocal resonance and fremitus. The heart beats in the median line. The right side is normally resonant, and the breath sounds on this side are exaggerated, with some rhonchus in front, not behind. There is no marked difference in size between the two sides, the left being a trifle the smaller of the two.

May 11th.—Ordered Mist. Quin. c. Ferro ʒj t. d.; Ol. Morrhi. ʒij b. d. Paracentesis thoracis to be performed. About 10 oz. of serum were removed, and for a few days he was much relieved.

On the 20th he was not so well, his evening temperature on that and the following day being 103° and 102·2°, and his respirations 32 and 28.

22nd.—There is much tenderness about the left ribs, where there is a fluctuating swelling obliterating the intercostal spaces and tending to point. He has had much pain in the left side, with occasional rigors. The left side is one inch larger

than the right. He was again tapped, and 100 oz. of sero-purulent fluid were removed.

May 25th.—He seems better. He coughs and expectorates a little muco-pus. He is very weak, and sweats a good deal. On sitting up there is dulness up to the clavicle on the left side. There is resonance in the upper part of the front of that side on lying down. The neighbourhood of the puncture is prominent and tender. At the right apex there is *bruit de pot fêlé* and rhonchus.

On the 26th the wound in the left side reopened spontaneously, and an abundant discharge of offensive pus took place, which continued till June 2nd, on which day, early in the morning, hæmorrhage from the side commenced. Solution of ergotine was twice injected subcutaneously without any effect, and in the evening he began to cough up blood in large quantities. He was ordered Ol. Terebinth. mxv, Acidi Gallici gr. v, every hour; but the hæmoptysis and hæmorrhage from the side continued at intervals until his death on June 6th.

After death, in the left pleural cavity there was a quantity of thick lymph, and about 64 oz. of blood (the clots weighed 3 lbs.). The left lung was covered with lymph, collapsed and airless. The lower lobe contained several masses of bronchopneumonic tubercle and clots of effused blood; in it there was one small cavity which seemed to communicate with the pleura. In the upper lobe of the right lung were several masses of tubercle and some small cavities..

CASE 7.—Circumscribed empyema of right side, displacing liver downwards; paracentesis below the ribs and introduction of drainage tube; recovery.

Charlotte S—, æt. 8, was admitted, under Dr. Murchison, on the 22nd May, 1872.

She is stated to have been always delicate. Her present illness commenced six weeks ago with a rigor, since which time she has been feverish, has lost appetite, has got thinner, and has continually lain on her right side.

Family history good. She has seven brothers and sisters, all in good health.

Condition on admission.—She is pale and emaciated, with some lividity of lips. Pulse 120; respirations 32; temperature 102·6°. Tongue clean and moist, not too red. Has not much appetite, but is very thirsty. Bowels open. Heart sounds normal. Has occasional cough without expectoration. Below the left clavicle there is slight comparative dulness on percussion, but no friction or crepitation; posteriorly there is also comparative dulness and harsh breathing over left supra-spinous space; over the rest of the left lung respiration is puerile, and there are nowhere any bronchial râles, dry or moist.

Anteriorly the hepatic dulness is apparently much increased, extending from the nipple to the umbilicus, and measuring seven inches in the right nipple line. The lower part of the liver is smooth, but very tender. The child complains occasionally of pain in the right side. The subcutaneous veins are too distinct.

Posteriorly, on the right side, there is dulness and absence of respiratory sound and vocal thrill over the lower two thirds of the right lung.

Ordered milk diet with beef tea; Mist. Salin. ʒss, 4tis horis.

May 25th.—The surface of the liver is smooth, not notably tender. The lower

two thirds of the right side of the chest behind does not expand in inspiration. The liver appears to be displaced downwards by pleuritic effusion, and is probably not enlarged. The temperature since admission has ranged from 99.6° to 102.8° .

29th.—She lies on the right side. The skin is hot. Respiration is distinctly heard over the upper third of the right lung. The heart's apex beats in the fifth intercostal space, half an inch outside the left nipple. After movement her respirations are 64 in the minute. She has perspired the last two nights. On the right side the intercostal spaces are effaced, and there is no respiratory movement. Ordered Tinct. Ferri Perchlor. mx , Sptus. \AA eth. Nitrici m\ss , ex Aquâ quater die.

30th.—There is now marked bulging of the right side below the nipple, with effacement of intercostal spaces. Above the fourth rib there is resonance and distinct breathing. Posteriorly there is dulness over fully the lower two thirds of the right lung, its upper boundary line somewhat arched upwards. Over the bulging part pretty distinct fluctuation may be felt, both between and below the ribs, in the right nipple line.

June 1st.—The child is still very ill. On looking at the abdomen the liver *appears* enormously enlarged, the upper part of the abdomen distinctly bulging, especially on the right side, and the lower margin of the liver descending to the level of the umbilicus. All the abdominal veins are unusually distinct, and appear much enlarged. The abdominal parietes move freely in respiration, and there is no ascites. The dulness on the right side in front extends to immediately above the nipple; above this there is clear percussion and vesicular breathing, but below there is distinct bulging of the ribs and of the intercostal spaces, with fluctuation between the ribs, and also below them in the right hypochondrium. Posteriorly the dulness, absence of breathing, and bulging of intercostal spaces extend over the lower two thirds of the right chest. Its upper margin is distinctly arched, and has not ascended since it was first noted, but the lateral bulging has increased much. Pulse 150; respirations 50; temperature 102.2° . There is much pain and distress on the slightest movement; she has no rigors; but for the last three or four nights she has perspired profusely.

At 2 p.m. Mr. Croft introduced an exploratory needle *below* the ribs in front, in about the line of the nipple; two or three drops of a clear fluid spurted out, containing chlorides, but also much albumen. A larger trocar was subsequently introduced, and fifty-three ounces of pus drawn off; the first that came was thin, but the last thick and opaque. Finally, the opening which was below the ribs was enlarged with a tenotomy knife, and a drainage-tube was fastened in. The breathing was immediately relieved, and it was observed during the operation that *the lower margin of the liver ascended at least two inches, but that no change took place in the level of the upper margin of the dulness in the right chest.*

3rd. The child has been much better. She now lies on her back. She has much less pain. Very little pus is discharged through the tube, the end of which is kept in water. Pulse 114; respirations 30; temperature 97.8° .

The temperature continued normal till the 9th, when the child became rather feverish. In the evening her temperature was 100.5° ; pulse 150; respirations 36.

13th, 11 a.m.—Temperature 102.2° ; pulse 150; respirations 42. Ordered Quin. Sulph. gr. ss, Acidi Nitro. hydrochl. dil. mx, Tinct. Aurant. mx, Syrupi ʒj, Aquæ ad ʒij, t. d.

17th, 11.30 a.m.—Temperature 103° ; pulse 140; respiration 38.

19th.—She is going on fairly well, but for the last nine days the temperature has been often elevated, varying from 98.4° to 103° , and the pulse from 120 to 150. She sleeps well, takes her food well, has had no rigors. Tongue moist and clean, bowels open. About three ounces of thick pus are daily discharged from the side, which for several days has been distinctly fetid, although the cavity is washed out daily with Condy's fluid, injected through the elastic tube.

22nd.—To-day a counter-opening has been made in the back between the ninth and tenth ribs under chloroform, and a perforated elastic drainage tube passed through the two openings. About six or eight ounces of very fetid pus were removed during the operation.

25th.—Two thirds of a pint of very fetid pus evacuated. The cavity to be injected with a solution of bichromate of potash ($\frac{1}{100}$).

27th.—Cavity to be washed out daily with a solution of carbolic acid ($\frac{1}{100}$).

July 3rd.—The pus does not come away very freely. The tube ordered to be moved about more freely, and more carbolic acid injected.

15th.—Ol. Morr. ʒj, b. d.

From this time forwards the quantity of pus daily discharged from the tube gradually diminished, until by the middle of August there was only a slight oozing of yellowish serum, a few drops of which were removed, when the tube was daily shifted about and cleaned. With the exception of one slight rigor, followed by a little rise of temperature on August 29th, the child has progressed rapidly to convalescence since the counter-opening was made, gaining flesh and strength. The tube was removed on September 28th, and both openings healed up in a day or two.

On October 16th her condition was noted as follows: She has had no bad symptoms since the removal of the tube. Both openings are completely cicatrised; the anterior one is situated in the line of the nipple over the lower margin of the last rib, and the posterior one is situated over the ninth rib in a line with the posterior margin of the axilla. There is scarcely any difference on inspection between the two sides of the chest; if anything there is a slight excavation below the right nipple. The hepatic dulness commences at the upper margin of the sixth rib, one inch and a half below the nipple, and extends three inches downwards, but not below the edge of the ribs. There is clear percussion on the right side posteriorly, with vesicular breathing down to the normal level, and nowhere over the lungs on either side is there any friction, crepitation, or abnormal sound of any sort. There is no difference between the two sides on measurement two inches below the nipple, the girth of each side being eleven and a half inches. There is still slight dulness and harsh breathing below the left clavicle.

October 31st.—The child is plump and hearty, and for several weeks has been running about the ward. Was discharged well on November 1st.

CASE 8.—*Acute empyema; thrombosis and plugging of left jugular vein and of longitudinal and lateral sinuses; cerebral hæmorrhage; death.*

Edward N—, æt. 16, was admitted, under Dr. Bristowe, on the 17th June, 1872.

His illness commenced on the 14th inst., with headache, sickness, and general pains, especially in the left side. On the evening of admission his temperature was $105\cdot2^{\circ}$; pulse 148; respirations 48.

Ordered Ammon. Carb. gr. v, Liq. Ammon. Acet. ʒij, Sptus. Eth. Nitrici ʒss, ex Aquâ, 4tis horis, and a linseed poultice to the left side.

18th, a.m.—Temperature 100° ; pulse 108; respirations 48.

18th, p.m.—Temperature $103\cdot8^{\circ}$.

19th, a.m.—Temperature $102\cdot6^{\circ}$; pulse 120; respirations 40.

The physical signs on the 19th were noted as follows:—The heart is almost wholly to the right of the sternum. The heart sounds are healthy. While lying on his back the left side is dull from the clavicle to one inch below the nipple; the dullness extends lower when he is raised. The left side does not move in respiration, and measures $14\frac{1}{2}$ inches, the girth of the right side being 14 inches. The percussion note is high-pitched at the extreme apex in the left front; on this side vocal fremitus is absent, and the breath sounds are hardly audible anywhere except at the apex and along the spine. There is no friction or crepitation to be heard, and no marked tubular breathing. He is very delirious.

Paracentesis was performed, and eighteen ounces of sero-purulent fluid removed.

19th, p.m.—Temperature $101\cdot8^{\circ}$; pulse 120.

20th, a.m.—Temperature $100\cdot5$; pulse 100.

21st, a.m.—Temperature $99\cdot4^{\circ}$; pulse 100.

22nd, a.m.—Temperature $99\cdot2$; pulse 100. He has been delirious each night. Tongue dry, thickly coated. The heart still beats to the right of the sternum. The left side of the chest is over-resonant in front, where the breath sounds are feeble and somewhat blowing.

He continued in much the same condition till 1 a.m. on the 25th, when he had a kind of fit, in which there were involuntary twitchings, principally of the flexor muscles of the right arm and leg. During this attack he was unconscious, but the conjunctivæ were sensitive.

25th, 10 a.m.—Temperature $101\cdot2^{\circ}$; pulse 140. There is twitching of head, body, and limbs. The pupils are dilated, equal, and sensitive to light.

2.45 p.m.—Temperature $101\cdot2$. Left pupil dilated. He died at 6.40 p.m.

On post-mortem examination the left lung was found collapsed and airless, with no pneumonic consolidation; its surface, as well as that of the costal pleura, was covered with thick masses of soft yellow lymph, easily detached. The pleural cavity contained twenty-two ounces of pus.

The right lung was healthy, but full of blood.

The heart was almost entirely to the right of the middle line. There was no pericarditis.

The brain was much congested. The veins at the base on the left side were plugged with solid black clot, as were also the longitudinal and the left lateral sinus, and the left jugular vein in its entire course; the latter was very much distended, the clot in the lower part of it being mottled and partly decolorised. There was a patch of cerebral hæmorrhage in the outer and posterior part of the left lobe. There was also some superficial extravasation.

CASE 1.—The interest of this case principally lies in the obscurity in which the cause of the effusion into the left pleura has been involved. At first it seemed to be a case of ordinary pleurisy with serous effusion, but its persistence, the appearance of glandular enlargements, and of periosteal thickening in its neighbourhood, and, finally, the nature of the fluid removed from the chest, and the appearances found in the gland which was removed, lead to a far more grave diagnosis. From the circumstances following the last tapping it is quite evident that the left lung is entirely incapable of expansion, some of the air admitted into the pleural cavity during the operation having remained there for several days, and there being no respiration audible on that side, except just at the outer part of the apex and along the spine. Also, he has occasionally coughed up glairy, brown sputum in small quantities, very much resembling the fluid removed by the tapplings. From this it would appear likely either that there is a communication between the left lung and the pleural cavity, or that some similar change is taking place both in the lung and in the pleura. The most favorable points in the case are the comparatively good general health of the patient and the extremely slow growth of the morbid deposit, evidences of whose invasion have been present since August, 1871.

In Case 2 suspicions were at first entertained that there was serious phthisical mischief involving probably both lungs, but the great improvement which has taken place in her general condition has tended much to alter the grave prognosis which such suspicions involved. It is curious that the pus collected in the pleura selected a point of exit so far removed from that which would probably have been chosen if paracentesis had been decided upon before the abscess had appeared, and it is interesting to observe that the recovery proceeded much more rapidly when the second means of exit, through the bronchial tubes, had been established. In this case the lung, which had

probably been long compressed by the fluid and had collapsed, although it did not expand as soon as the pressure was removed, as shown by the presence for a time of pneumothorax, did eventually expand, at all events enough to fill the somewhat contracted pleural cavity.

Cases 3, 4, and 5 all come under the same category—empyema, in which the pus found an exit through the bronchi, and I think we may assume that this mode of getting rid of the pus leads at all events to as good results as could be expected from any operative interference.

In Case 3, though there were the serious complications of a puerperal condition, and probably pyæmia, yet a good recovery took place, effected by a natural process of cure, simply aided by good nursing and good living.

In Case 4 the empyema, which existed on the left side, in combination at first with some consolidation of lung, also chose this method of evacuating itself, and the boy has certainly regained health, and at his time of life there is reason to hope that the lung will eventually re-expand to a considerable extent.

In Case 5 the patient was decidedly improving in condition up to the time of his leaving this hospital, and so far was another instance of favorable result from the evacuation of an empyema through a bronchial tube.

CASE 6.—In this case the pleurisy in the first instance may have been connected with the phthisis, with which both of the lungs were found to be affected. After the tapping, when the effusion was serous, and possibly in consequence of irritation set up by that operation, pus commenced to be formed in the cavity; finally, after the second tapping, hæmorrhage took place into the pleural cavity, probably from the lung, a communication being afterwards found between a cavity in that organ and the pleura, the blood from which was first discharged from the wound in the side, and subsequently through the bronchial tubes as well. The hæmorrhage in this case could hardly have been the result of the tapping, as it did not commence till eleven days after that operation, and as from the post-mortem appearances there was strong reason to conclude that it proceeded from the lung; it was very curious, however, that it should first find an outlet through the pleura, and thus

give rise to the suspicion that it might have been caused by a wound of an intercostal artery.

CASE 7.—This is a case of great interest, owing to the difficulty attending the diagnosis at first, and the very successful results eventually obtained. The empyema simulated an enlargement of the liver, the resemblance being much heightened by the arched shape of its upper margin behind, while the possibility of a collection of fluid between the upper surface of the liver and the diaphragm had also to be taken into consideration.

The puncture was made distinctly below the ribs, and the drainage tube must subsequently have been passed along the anterior surface of the liver through the diaphragm into the pleura. The upward movement of the liver during the removal of the fluid showed its freedom from connection with the abscess, while the absence of change in the position of the lower border of the lung indicated that the latter could not readily at once expand, owing, probably, to its being partly bound down by adhesions, thus pretty well establishing the diagnosis of an empyema.

The progress of the case after the tapping was not very favorable at first, owing to the fact that there was not a free escape provided for the pus; as soon as this was established by the counter-opening being made in the back of the chest, the progress to convalescence was rapid and uninterrupted.

Finally, the present condition of the patient shows what excellent results may be obtained from the free evacuation of the pus from an empyema by means of two openings, especially when, as in this case, the youth of the patient contributes to the chances of recovery. There appears to be very little or, indeed, no contraction of the affected side, while the two small scars of the punctures, the anterior one in a position which might puzzle any one desirous to ascertain its object, alone remain as evidences of the formidable mischief which, a few months ago, seriously endangered the life of the child.

CASE 8.—Here we have an instance of remarkably rapid acute empyema (its whole duration being eleven days), accompanied with a complication happily very rare.

From the condition of the clot in the lower part of the left jugular vein, where it was found to be "mottled and decolor-

ized," I think we may conclude that its commencement was in that neighbourhood; and from this we arrive at the probability that the inflammation of the left pleura may have, by contact, set up inflammatory action in the left innominate vein, which is generally almost in contact with that membrane, and so caused plugging of the left jugular vein, commencing at its connection with the innominate vein, and gradually extending through its entire length and into the veins and sinuses of the brain. The obstruction thus caused to the return of blood from the brain may have given rise to the small patch of cerebral hæmorrhage which was found in the outer and posterior part of the left lobe, and which in its turn may have accounted for the one-sided convulsive symptoms observed during the last few hours of the patient's life.

ON

TEMPERATURE IN SURGICAL CASES.

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II.—PYÆMIA.

I HAVE in a previous paper ('St. Thomas's Hospital Reports,' vol. i, p. 465) examined the value of temperature observations in a class of cases where shock has occurred to the nervous system, by different means and through different channels, and the results obtained show the value of such observations in assisting in both diagnosis and prognosis. Moreover they show that both life and recovery are compatible with much greater depressions in temperature than was previously supposed.

In this paper I propose to examine the temperatures observed in another class of cases, and to see how far in these the thermometer can be looked upon as a useful adjunct to our means of determining the extent of disease and the consequent probabilities of recovery.

The temperature of the body in pyæmia is so evidently important that a few observations may be made on its value as a means of prognosis and of diagnosis. This is all the more requisite, as very little is said on the subject in the various modern treatises on pyæmia—so little, in fact, as to be of no practical assistance to the surgeon. Wunderlich gives but slight notice to it, and his observations have evidently been few or only related to the medical forms of the disease, as they certainly do not apply in many points to pyæmia as seen in the surgical wards of a hospital.

The symptoms of pyæmia vary so much in intensity in different cases that it is obvious that the temperature of the body will also differ greatly according to the character of the case—according, apparently, to the acuteness of the disease, and to the susceptibility of the body at the time to active changes. It will, therefore, be necessary to bear in mind these differences in acuteness of symptoms when examining the temperature in the various periods of pyæmia.

Commencement.—Pyæmia is usually made evident to the surgeon by a sudden and severe rigor, and coincident with the rigor is a sudden rise in temperature of from 2° to 6° F. In acute cases the first rise—or, rather, its excess over the previously recorded temperature of the case—is not usually so extreme as occurs during subsequent rigors, but the temperature which is reached is nearly as high as is afterwards recorded. It might, perhaps, be expected that the rigor, expressing as it probably does the disturbance to the system by the introduction into the circulation of the poison of pyæmia, would be attended by a similar elevation in temperature with each introduction of a fresh quantity of poison, and it may be that it is the character rather than the amount of the poison which gives rise to the elevation in temperature. This will be the case provided that the body in other respects is not materially altered; but if the changes produced by the disease itself, or by the disease upon which the pyæmia is engrafted, rapidly or progressively affect the system in its power of accepting chemical change, there would then be a corresponding difference in the temperature during different rigors, for the temperature is necessarily the evidence of the chemical changes taking place.

The fact of the first rise not being usually so great as that which occurs during subsequent rigors is to be explained by the previous depression of temperature being little or nothing at the onset of the disease, whereas, later on, and particularly towards the close of the case, the fall in temperature between rigors is often very remarkable, so that a difference of 9° or 10° is sometimes found in the course of twenty-four hours.

Before the first rigor occurs there occasionally happen certain peculiarities in the state of the temperature to which attention must be called, as they may assist in forewarning the surgeon at times of the approach of this dreaded complication.

There may be sudden variations of temperature without rigors, and these marked variations appear to be more significant than a persistent, though it may be extremely high temperature. On the other hand, there may be a rather persistent and abnormally high temperature, which will indicate one of two things important to diagnose between. It may indicate that suppuration is occurring in connection with the wound, and requires the assistance of the surgeon for its relief, lest the system should be more contaminated and, possibly, pyæmia itself induced; or it may indicate that, without the existence of such local and removable causes, the condition of the blood is that of active chemical change, and therefore all the more liable to the influence of such a blood poison as pyæmia.

As an instance of the first of these states I may cite the case of a boy, C. B— (No. VI in the appended table) whose hip was excised on April 3rd. The temperature rose to 102° on the 4th, dropped slightly next morning, but rose to 104° during the course of the day, again fell by zigzags to 100° , and rose suddenly to 104° on the 8th. On the 10th it was 102° , and on the 11th rose to 106.4° coincidently with a rigor and with the deposit of pus in the opposite knee-joint—the first obvious indication of the occurrence of pyæmia.

The case of W. B— (No. XI in the table) is an instance of the second of these conditions, that of a persistent and abnormally high temperature preceding the occurrence of the disease. In this case—one of severe compound fracture of the scapula and humerus necessitating primary amputation—the thermometer showed the usual high and rather varying temperature of great reaction, gradually subsiding to 100° on the 8th day. After this, however, the temperature rose rapidly to 105° , and remained about this point for two days, when it fell suddenly to 100° shortly before the first rigor. It then rose to 105.6° . Here the cause was probably to be found in the accumulation of pus among the muscles of the scapula, and, possibly, the non-detection of this, and its consequent non-removal, formed the start-point of the pyæmia.

Again, in the case of H. G— (No. XIII in the table) the temperature rose on the day following excision of the knee-joint to nearly 105° , and on the next day the first rigor appeared, but no abscess was seen until five days after, when the elbow-

joint was affected. Here, probably, the unusually high temperature of reaction indicated, not the collection of pus in any part, but rather that the blood was in such an active state of chemical change as to be readily a means of producing, or a suitable soil for receiving, pyæmic infection.

In certain cases, differing slightly from the last, the temperature rises suddenly a short time before the first rigor, without its being traceable to simple but severe reaction; and in such cases it must be assumed that the rise is due to the first introduction of the poison—to the occurrence, in fact, of septicæmia, from a special poison, and not from simple septic changes in the wound. Such a case is exemplified by that of A. M— (No. VIII in the table), where, after excision of the knee-joint, the temperature of reaction ranged for five days between 102° and 100° , and on the ninth day rose suddenly to 106° without a rigor, and fell as rapidly to 98° , rising again to 104° with the first rigor which appeared on the following day.

Progress.—The peculiarity of the temperature in the progress of pyæmia may be roughly stated to be its extreme variations, but one feature of these variations seems to be that the temperature usually falls to the normal or below it as suddenly as it rises to its great height; and the maxima correspond with the period of rigors, while the minima correspond with the time between them. But these startling variations are not by any means always found, for in the less acute cases the temperature reached sometimes does not much exceed 102° (as in cases numbered 19 and 20). There is another class of cases also in which the temperature does not show the wonderful ranges common in the ordinary forms of pyæmia. This includes cases of asthenic cellulitis, putrid infection, and gangrene, and allied conditions; almost all are patients whose vital power has been seriously depressed previously to the occurrence of pyæmia.

It is important to notice what has been referred to above as to the fall of temperature usually to nearly the normal standard between the great elevations, as great rises in temperature not infrequently occur in other diseases, as erysipelas, acute cellulitis, and other acute diseases; but the above-mentioned peculiarity is, so far as I am aware, absent in such cases. As a means of diagnosis this peculiarity was depended upon in the

following case, where the other symptoms of pyæmia appeared to be present :

E. H—, æt. 18, was operated upon for exostosis of the femur, and the temperature of reaction, two days after operation, was registered 105° , when rigors occurred. The temperature, however, remained high, and only fell gradually to 101° on the fifth day, other rigors occurring meanwhile, apparently owing to the accumulation of foul pus in the wound. Twenty days after operation erysipelas set in, with a temperature of 103° , rising quickly to 105° , and then remaining about that point, only twice going below 102° , until her death, twelve days later, when it fell to 101° . Her symptoms during this time were strongly suggestive of pyæmia—sickness, delirium, bronchitis, and a typhoid condition, together with the faint odour of the breath which some are inclined to look upon as a symptom of pyæmia; but the post-mortem showed no secondary deposits, and it is fair to assume that the nature of the disease was erysipelas with its attendant blood-poisoning.

It appears that the rigor of pyæmia is usually preceded by a fall in temperature, and in one case, of which I have careful notes, this fall was followed by a rapid rise immediately before the rigor was evident. During the rigor it rises rapidly, and this continues for a variable time after the rigor has disappeared. An excessively low fall is often seen before approaching death, and must always be looked upon as an unfavorable sign.

It will be seen from the appended table that the temperature at or near the time of death differs considerably in the different cases, but that in the larger proportion it is high. Of twelve cases in whom the temperature was registered within twelve hours of death seven had a temperature above 103° , and only two below 100° , and all these cases were examples of the acute form of the disease.

The post-mortem examination of the twenty cases recorded below does not indicate any relation between the temperature of the rigor and the locality of the deposit, or between the temperature of shock, as we may consider the antecedent falls, and the organ or part in which the secondary deposits are found.

Is the thermometer of any value as a means of diagnosis in pyæmia? I do not think we are yet in a position to answer this question fairly, for our observations in this direction are not sufficiently extensive; but the direction in which inquiry may reasonably be made, with the expectation of arriving at some conclusion, may, perhaps, be indicated by those now recorded. It must first be noticed that the height to which the tempera-

ture rises is usually very great, but this in itself is certainly no safe indication of pyæmia, for though this has been recorded as high as 110° in two cases of which I have single observations, yet the temperature reached in other acute diseases has been equally great. Only recently a case of fractured spine has come under my observation in which the thermometer registered nearly 109° before death; and another of doubtful character—possibly of tubercular meningitis—reached 108.5° , and recovered. The height of temperature cannot, therefore, be said to be diagnostic of pyæmia.

Can the suddenness of rise in the first instance be looked upon as distinctive? This must be answered in the negative. Thus a case of abscess of the breast was admitted into hospital, and was recovering, when suddenly the temperature rose to nearly 106° , in consequence of diffuse suppuration occurring in the gland; but it must be noticed that the temperature remained high, without any marked variation, and fell gradually as the patient recovered. In another case of the same character the temperature rose suddenly to nearly 105° at the onset of the disease, and also fell gradually as she improved. In facial erysipelas, also, it is not uncommon to find a sudden rise to 106° or more, and yet the patient recover. We may, therefore, assume that the sudden rise of temperature to a great height is no certain indication of the existence of pyæmia.

With regard to the variations in temperature which occur during the progress of the disease, can anything be determined from them which may help to a diagnosis? This seems probable. In nearly all the cases tabulated here the suddenness and great extent of variations formed a marked feature of the temperature observations; but somewhat similar sudden variations I have noticed in other cases, particularly of the acute kind, and more especially in patients suffering from a disease closely allied in its pathology to pyæmia. I refer to phlebitis. However, there seems to be a difference of some importance. In no cases that I have had the opportunity of examining has the temperature fallen so low between the great rises as in pyæmia. And this peculiarity, I think, demands attention in the examination of cases of pyæmic infection in future; and until we obtain further information we may accept as a suggestion that where sudden and great variations in temperature occur, the maxima

reaching from 102° to 110° , and the minima going below 99° , or occasionally 100° , with or at first without rigors, pyæmia is indicated.

Is the thermometer of any value as a means of prognosis in this disease? If taken alone, I am afraid this cannot be answered satisfactorily. Sometimes, however, it will be of assistance, as an unusually great depression often precedes death—an evidence of the amount of shock to which the system has been subjected, and this cannot be appreciated accurately by any other means than the thermometer. It may be noticed that, usually, the height reached by the temperature indicates the acuteness of the attack, and, *cæteris paribus*, will therefore indicate the shortness of time which the patient will have to live, unless he has the rare fortune to recover. This, therefore, may assist the surgeon.

Again, an increased frequency of variations or an increased extent of variations constitutes an unfavorable sign.

But it is not alone that any one aid to diagnosis or prognosis must be trusted, and it is not to be expected that the thermometer alone will meet our requirements in these respects. It must, however, be looked upon as a useful adjunct, and to the scientific surgeon an essential for the thorough knowledge of the case.

In this paper I have examined temperature apart from other symptoms in order to show what value it possesses, and just as in shock I have shown that if carefully observed it may be of great assistance, so also in these cases of pyæmia it must be allowed to be sometimes of great service, though its use *per se* is here, perhaps, of less unequivocal value.

Table of Temperature and Rigors in Pyæmia.

CASE.	Max.	Min.	Greatest difference in 24 hours.	Death temp.	Time of last observation before death.	Total number of rigors in 1 day.	Greatest duration.	PROGRESS.	RESULT.	POST-MORTEM.
1. F. P., perineal section	107.0°	96.6°	9.0°	101.2°	1½ hrs.	26	3	Sudden rise, extreme zigzags	Died	Deposits in lungs and lungs
2. — amputation	107.0°	101.0°	3.7°	107.0°	7 "	...	...	Variations very marked	"	Deposits in areolar tissue and heart.
3. A. H., excision of knee	106.8°	101.0°	5.8°	103.8°	½ "	1	1	Sudden rise, variations	"	Deposits in pleura and lungs.
4. E. W., excision of knee	106.6°	99.0°	5.2°	103.6°	6 "	5	1	Sudden rise, marked variations	"	Phlebitis, deposits in viscera.
5. A. P., removal of bone tumour	106.2°	102.2°	4.0°	106.2°	At death	...	...	Sudden rise, zigzags	"	None allowed.
6. C. B., excision of hip	106.2°	100.0°	4.2°	102.0°	3 days	5	3	Sudden rise, great variations	"	Deposits in areolar tissues.
7. J. P., amputation of breast	106.0°	99.0°	7.0°	105.2°	3 hrs.	9	3	Sudden rise, great variations	"	Deposits in lungs.
8. A. M., excision of knee	106.0°	97.8°	7.0°	97.8°	1 hr.	1	1	Sudden rise, typhoid condition, great variations	"	" joints.
9. G. M., herniotomy	105.9°	98.4°	7.5°	103.0°	...	7	2	Sudden rise, extreme variations	"	" lungs.
10. S. R., brain concussion	105.7°	98.4°	7.2°	105.1°	½ hr.	11	4	Extreme variations	"	" lungs, areolar tissues.
11. W. B., amputation of shoulder	105.6°	99.8°	5.6°	101.2°	¼ "	3	3	Sudden rise and fall	"	Deposits in areolar tissues.

12. W. S., cellulitis .	105.5°	101.0°	4.5°	104.0°	12 hrs.	...	...	5	High temp., typhoid, variations not well marked	"	Deposits in lungs, pleura, mediastinum, limbs.
13. H. G., excision of knee	104.3°	100.2°	2.6°	100.8°	2 "	1	1	11	No very great variations	"	No examination allowed.
14. H. K., amputation of thigh	104.0°	98.0°	3.6°	99.8°	6 "	...	...	6	No sudden variation until day before death	"	Deposits in joints, strumons pyelitis.
15. C. G., compound fracture of leg	103.4°	98.4°	5.0°	98.4°	2 days	8	3	14	Rise during rigor, subsequent fall	"	Deposits in joints and lungs.
16. I. G., amputation of leg	103.4°	103.0°	0.4°	103.0°	1 day	6	2	4	Steady high temperature	"	No p.m.; deposits probably in joints and lungs.
17. W. R., lacerated foot	103.0°	101.0°	1.8°	...	...	...	...	16	Steady high temperature, deposits in joints	Recov.	
18. — necrosis, cellulitis	103.0°	100.0°	...	100.5°	...	...	...	22	Not much fluctuation	Died	Deposits in lungs.
19. W. C., amputation of thigh	102.2°	99.4°	2.0°	99.4°	3 hrs.	3	1	10	Slight variations	"	Tarbid fluid in brain, pericardium petechiae, inflamed tonsils.
20. A. W., amputation of shoulder	102.2°	96.2°	4.1°	...	...	9	5	65	Very great variations	"	Deposits in joints and spleen.

Note.—Cases 5 and 13 are doubtful, since no post-mortem examination was obtained, but the symptoms would lead to the probability of pyæmia, and they have therefore been included. It is worthy of notice, however, that in these cases the minimum temperature was higher than that observed usually in the other cases. Case 19 is also doubtful, the post-mortem appearances suggesting scarlatina.

ON SOME POINTS
IN THE
MEDICAL HISTORY OF THE CLERGY
MUTUAL ASSURANCE SOCIETY.

By W. H. STONE, F.R.C.P.,

AND

STEWART HELDER,
FELLOW OF THE INSTITUTE OF ACTUARIES.

THE late Secretary and founder of this flourishing Society, not long before his death, had consented to our expressed wish that we should conjointly draw attention to some statistical and medical points of its early history. As the task, commenced some time ago, had been delayed by press of urgent business, his consent has since been more formally confirmed by the present Committee of Management.

The reason and object of such an association between the Actuary and Physician to the Society will be obvious to any one who looks over mortality tables as collected by several of the older and larger offices; whereas some are too strictly and exclusively medical, others, the majority, are purely collections of figures collated with numerical accuracy, and though well adapted for actuarial purposes, convey little or no professional information to the medical officers of similar corporations. To be generally useful such papers as the present should partake almost equally of the statistical and of what may be termed the

ultra-statistical element. The meaning of the former phrase is clear; by the latter we wish to denote those farther and less mathematical deductions which can be drawn in abundance, and with perfect legitimacy, from any large collection of deaths, especially when, as here, they are supplemented by details of family history and other accurate medical and actuarial information.

It was from the first obvious to both of us that the mere record of deaths and causes of deaths for each year, or for any stated period of years, would be worthless, if not misleading, unless closely collated with the number of insured members at each such period. This necessarily involves a work of great labour, which we hope in time to accomplish. But for the present we propose to give a general preliminary sketch of prominent points in the early history and mortality of the Society, reserving for a later communication the details above referred to.

The Clergy Mutual Assurance Society was established in the year 1829, under the Friendly Societies Acts, for the purpose "of raising a stock or fund, by means of the joint contributions of its members, for the mutual relief of each other, their wives, children, relations, or nominees, in sickness, infancy, advanced age, widowhood, and other natural states and contingencies, the occurrence of which may be calculated by way of average, and for the lawful assurance of money to be paid on the death of members." Thus, it will be seen that the object of the founder, the Rev. John Hodgson, was not to introduce any new plan of life assurance, but to apply the then existing systems to a society with which the clergy were invited to associate themselves, the assumption being that the mortality which would be found to prevail amongst them as a body would be far more favorable than that which had been previously found to prevail amongst the general community. Experience has proved this assumption to be correct; but had it been otherwise it would in no way have affected the stability of the society, as the premiums for assurances upon life were based upon the well-known Carlisle Table, with a percentage added for expenses of management, so that, as long as the rate of mortality among the clergy did not exceed that of the Carlisle Table, whilst there would be no profit from this source, there, at the same time, could be no loss.

It should, however, be observed that the business of the office

is not limited exclusively to clergymen; their near relations, male and female, and also their wives and the near relations of their wives being eligible. But the number of females and laymen thus admitted is proportionally small, and hardly sufficient to justify separate tabulation. In each case the deaths are not much above 50 on a total of over 1000.

It is not the intention of this paper to notice the sickness, the annuity, and the endowment branches, which also form a very small percentage¹ of the Society's transactions. Some of these we may probably consider on a future occasion; but we propose to give, in the first instance, a brief history of the earlier life policies.

When the Society was first established it was judged expedient not to make it liable for any claims to arise from death until they had the necessary protecting chances in their favour, which were considered amongst any number of mutual assurers to be not less than ninety persons. But as it was thought that application for assurances would be made the more readily and numerous when business was fully commenced by the admission of assured members, the following resolution was passed in October, 1829:

“Resolved—That the persons who have proposed to make assurances **D**² be admitted assurers of such assurances respectively upon exhibiting the requisite certificate of health and signing the proper declaration, provided such persons so to be admitted consent to waive any claim or title to any benefit which may arise from their assurances until ninety persons shall have been admitted for assurances of the same kind. And in the case of assurers being admitted subject to the above provision, their first premium shall be immediately paid. And should any assurer die, and the claim upon his or her assurance be void in consequence of the provision as above, then shall the premium which shall have been paid upon his or her assurance be returned, with interest thereupon at the rate of 5 per cent. per annum.”

The consequence of this resolution was that, although the Society was established in 1829, the first policy was not signed

¹ Barely $4\frac{1}{2}$ per cent.

² The symbol **D** is used to denote policies for the whole of life.

until March, 1830. The required number of members was, however, soon obtained, and policies were issued for the respective amounts assured before a death occurred, thereby rendering a return of any of the premiums paid, with interest thereon, unnecessary. But an additional security was offered to the members by the formation of a guarantee fund, consisting of various sums subscribed by the clergy and other well-wishers of the Society. This fund, amounting altogether to £5182 18s. 4d., is still held in reserve, as it has never been required, the capital derived from premiums having been found since the commencement of the Society more than sufficient for the payment of all claims.

Of the first 90 life policies issued by the Society¹—

65 have become claims ;

6 have been purchased ;

5 „ „ forfeited by non-payment of premium ; and

14 are in existence at the present time.

It is worthy of remark that out of these 90 policies 3 deaths only occurred in the first 10 years, when by the Carlisle Table 11 might have been expected ; and 11 deaths in the next succeeding 10 years, when by the same Table 12 might have been expected, making in all 14 deaths in the first 20 years against an expectation in the same period of 23. It is also worthy of notice that out of the 65 deaths 10 took place over the age of 80, 26 over the age of 70, and 45 over that of 60. Altogether the average age at entry of the 65 policies which have become claims was $38\frac{1}{2}$, and the average age at death 66, making the average duration of each policy $27\frac{1}{2}$ years. The total amounts originally assured were £38,800, and the annual premiums payable thereon £1211 16s. 11d. On 36 of the policies assuring £18,950, at annual premiums of £611 10s. 2d., the premiums had been wholly reduced by bonus and additions amounting to £5657 made to the sums assured ; and on the remaining 30 policies, assuring £19,850, the original annual premiums of £600 6s. 9d. payable thereon had been reduced by bonus to £294 3s. 11d. per annum.

The average duration of the surrendered policies was 8 years, and of the forfeited policies nearly 2 years.

¹ *Ibid* Tables, pp. 147–149.

The average age at entry of the 14 policies still in existence was $33\frac{1}{2}$, and the average present age 76, making the average duration of each policy $42\frac{1}{2}$ years. The total amounts originally assured were £8300, and the annual premiums payable thereon, viz. £219 9s. 8d., have been altogether extinguished by bonus, and additions amounting to £4542, have been made to the sums assured, equal to nearly 55 per cent. of the original amount of the policies.

It is well known that the sources from which a life assurance company derives its profits are—

(1) A higher rate of interest obtained on the invested funds than that used in calculating the premiums.

(2) The difference between the amount added to the premiums for expenses of management, technically termed “loading,” and the sum actually required to meet those expenses.

(3) A more favorable rate of mortality prevailing amongst the members than that exhibited in the table upon which the premiums are based.

Thus, it will be seen that two companies may be in exactly the same position with regard to profits made under heads 1 and 2, and yet be widely different with regard to profits made under head 3. Now, there is no doubt that under this latter head a large proportion of the profits returned to the members of the “Clergy Mutual” by way of bonus has been derived. But lest it might be thought desirable to adopt a lower rate of premiums, owing to this very favorable “mortality experience,” a few remarks are here offered. It must be borne in mind that the contracts of a Life Assurance Company are not expected to terminate to-day or to-morrow, but are spread, on an average, over a long series of years. Hence a wise precaution was used by the founder in taking as the basis of the Society’s transactions a table of mortality which exhibited a rate that in all probability would never be exceeded by the members. It has already been shown that out of 90 lives assured more than forty years ago 14 are still alive, and it is hardly necessary to point out that of the 6000 policies now in existence a great many years will have passed away before they will have all fallen in, nor is it possible to say now what may happen at any time greatly to affect lives in their passage through so long a period. The same favorable rate of mortality may still continue to obtain

amongst the clergy, and most probably will; but assurance would not be what its name implies it to be were it not made amply secure by its annual premiums;¹ the adoption of this course is the more to be commended, inasmuch as the interests of the members in no way suffer by it, for, belonging, as they do, to a mutual society, the *realised* profits from *every* source are divided amongst them every five years.

The annexed tables have for their object to follow out the first 90 policies to their termination, whether in death, surrender, forfeiture, or as existing at the present moment; and also to trace the deaths during the first twenty years of the Society's existence, with special reference to the certified cause of such death. A table is also subjoined to show by comparison the difference per cent. in the annual mortality between clergy and laity.

Annual Mortality per cent.

Ages.	Twenty offices' experience.	"Clergy Mutual" experience.	Hodgson's Clergy Tables, 18th century.	Hodgson's Clergy Tables, 19th century.	Carlisle Table.
24 to 29	0·73	0·61	0·47	0·42	0·82
30 to 34	0·85	0·31	0·64	0·63	1·01
35 to 39	0·97	0·53	0·70	0·61	1·09
40 to 44	1·09	0·49	0·85	0·72	1·41
45 to 49	1·36	0·73	1·03	0·83	1·44
50 to 54	1·72	1·18	1·70	1·33	1·52
55 to 59	2·35	1·72	2·21	1·65	2·20
60 to 64	3·38	2·22	3·25	2·90	3·68
65 to 69	4·90	3·80	4·60	4·39	4·45
70 to 74	7·23	3·38	7·52	6·80	6·97
75 to 79	10·92	6·70	11·62	10·72	10·54
80 to 84	15·44	21·54	17·00	16·77	13·86
85 to 89	22·50	...	23·32	23·40	19·92
90 to 94	20·65	...	33·80	30·18	28·61
95 to 99	...	...	25·00	11·76	22·92
100	...	...	100·00		

¹ The Society, for the convenience of those members who may wish to pay a small annual premium, will take four fifths of the tabular annual premium, and allow one fifth to remain as a debt upon the policy, to be paid wholly or in part out of bonus at each quinquennial division of profits.

Claims by Death.

Policy No.	Sum assured.	Additions after total extinction of premium.	AGE.		Original annual premium.			Premium payable at death.	Number of bonuses allotted.
			Entry.	Exit.					
	£	£	Year. Mo.	Year. Mo.	£	s.	d.	£ s. d.	
1	500	395	45 8	84 10	18	1	8	...	7
2	1000	...	45 11	56 5	37	8	4	33 1 6	1
3	300	...	47 0	65 11	11	12	6	4 7 11	3
5	500	...	37 4	66 6	14	2	6	0 9 5	5
6	100	94	41 1	83 3	3	4	0	...	8
7	500	...	51 2	69 7	22	16	8	5 4 1	3
8	1000	40	39 8	69 1	31	1	8	...	5
10	1000	202	30 11	72 2	23	15	0	...	7
12	500	327	43 6	83 10	17	0	0	...	7
13	1000	...	40 7	51 4	32	0	0	28 12 6	1
15	500	116	50 11	75 9	22	16	8	...	4
17	500	425	51 10	88 3	23	13	4	...	6
18	500	29	57 10	75 4	32	2	6	...	3
19	1000	316	39 11	57 2	31	1	8	...	3
20	1000	...	38 3	55 0	29	3	4	16 12 5	3
22	300	90	41 5	75 6	9	18	0	...	6
23	500	101	31 0	68 4	11	17	6	...	7
27	500	59	34 7	66 9	13	5	0	...	6
28	500	247	39 7	80 7	15	10	10	...	7
29	500	113	52 8	77 8	25	0	10	...	4
32	150	...	34 7	63 0	3	19	6	0 9 1	5
33	500	166	50 4	80 8	21	16	8	...	5
34	500	...	45 7	58 5	18	1	8	12 12 0	2
63	500	170	34 7	75 2	13	5	0	...	6
92	400	63	37 1	70 6	11	6	0	...	6
109	200	23	26 5	63 3	4	5	0	...	7
110	500	...	19 10	32 10	8	15	0	7 1 1	2
111	250	...	50 0	59 11	10	18	4	9 10 9	1
125	200	41	38 11	74 6	6	0	4	...	6
132	1000	534	33 3	75 6	25	15	0	...	8
143	200	67	35 11	76 7	5	9	4	...	7
149	200	51	41 11	75 6	6	12	0	...	6
154	100	9	35 1	69 8	2	13	0	...	6
157	1000	...	33 5	58 7	25	15	0	10 6 1	4
160	1000	...	56 10	71 2	61	1	8	31 6 4	2
173	500	312	49 9	83 6	21	16	8	...	6
189	500	...	37 5	58 11	14	11	8	4 16 7	4
198	1000	146	29 10	67 7	23	3	4	...	7
200	750	...	39 6	62 4	23	6	3	6 9 7	4
204	500	...	31 0	55 3	11	17	6	5 5 7	4
215	500	...	29 6	51 11	11	11	8	5 5 10	4
221	1000	118	44 3	71 3	36	3	4	...	5
222	200	14	33 9	67 2	5	3	0	...	6
253	1000	173	46 11	77 1	38	15	0	...	5
256	500	...	30 1	55 1	11	17	6	5 6 3	4
272	400	...	30 5	57 2	9	10	0	2 14 9	5
274	500	431	40 9	81 6	16	0	0	...	8
285	500	...	27 0	45 9	10	12	6	7 2 6	3
288	700	62	34 1	65 11	18	11	0	...	6
292	1000	269	34 9	73 1	26	10	0	...	7

Claims by Death (continued).

Policy No.	Sum assured.	Additions after total extinction of premium.	AGE.		Original annual premium.	Premium payable at death.	Number of bonuses allotted.
			Entry.	Exit.			
	£	£	Year. Mo.	Year. Mo.	£ s. d.	£ s. d.	
298	1000	...	28 2	60 5	22 10 0	0 9 9	6
302	1000	...	36 8	40 0	28 5 0	28 5 0	—
313	500	...	31 11	53 6	12 3 4	5 6 9	4
318	1000	...	29 5	30 5	23 3 4	23 3 4	—
319	100	101	42 11	83 3	3 8 0	...	8
321	300	...	30 0	56 5	6 19 0	2 3 11	5
335	1000	...	37 0	65 9	28 5 0	3 9 10	5
340	1000	210	33 8	72 9	25 15 0	...	7
343	700	...	52 11	69 0	35 1 2	8 12 11	3
356	500	21	33 1	66 4	12 17 6	...	6
357	1000	...	25 6	31 0	20 13 4	19 6 7	1
372	1000	...	29 8	52 1	23 3 4	11 9 6	4
388	50	...	32 0	63 2	1 4 4	...	6
392	200	92	41 7	80 7	6 12 0	...	7
396	1000	...	39 11	62 2	31 1 8	10 17 1	4
TOTALS.							
65	38800	5657	2198 0	4288 10	1211 16 11	309 18 11	—

Surrenders.

Policy No.	Sum assured.	Additions after total extinction of premium.	AGE.		Original annual premium.	Premium payable at date of exit.	Number of bonuses allotted.
			Entry.	Exit.			
	£	£	Year. Mo.	Year. Mo.	£ s. d.	£ s. d.	
25	500	...	26 6	28 3	10 12 6	10 12 6	—
31	300	...	34 8	46 7	7 19 0	5 19 10	2
141	1000	...	31 4	34 7	24 6 8	24 6 8	—
192	500	158	56 10	78 4	30 10 10	...	4
270	300	...	28 10	32 1	6 15 0	6 15 0	—
316	500	...	37 11	45 1	14 11 8	13 7 5	1
(6)	3100	158	216 1	264 11	94 15 8	61 1 5	—

Arrears.

Policy No.	Sum assured.	Additions after total extinction of premium.	AGE.		Original annual premium.	Premium payable at date of exit.	Number of bonuses allotted.
			Entry.	Exit.			
	£	£	Year. Mo.	Year. Mo.	£ s. d.	£ s. d.	
9	100	...	26 2	27 2	2 1 4	2 1 4	—
16	500	...	21 0	24 0	9 0 0	9 0 0	—
180	500	...	35 11	37 3	13 13 4	13 13 4	—
358	800	...	45 2	46 6	29 18 8	29 18 8	—
395	250	...	33 6	36 9	6 8 9	6 8 9	—
(5)	2150	...	161 9	171 8	61 2 1	61 2 1	—

Existing 30th November, 1872.

Policy No.	Sum assured.	Additions after total extinction of premium.	AGE.		Original annual premium.	Premium payable now.	Number of bonuses allotted.
			Entry.	At date.			
	£	£	Year. Mo.	Year. Mo.	£ s. d.	£ s. d.	
4	500	368	37 8	80 4	14 11 8	...	8
21	500	438	39 10	82 9	15 10 10	...	8
24	200	98	32 11	75 10	5 0 0	...	8
26	600	159	25 8	68 8	12 8 0	...	8
30	500	313	36 0	79 0	13 13 4	...	8
108	1000	737	37 2	79 8	29 3 4	...	8
142	1000	220	23 11	66 5	19 10 0	...	8
195	1000	727	38 8	81 0	30 1 8	...	8
264	500	220	32 3	74 3	12 10 0	...	8
291	1000	568	35 2	77 0	27 6 8	...	8
330	800	382	33 9	75 4	20 12 0	...	8
331	100	77	39 11	81 6	3 2 2	...	8
362	100	21	26 8	68 0	2 2 6	...	8
364	500	214	33 1	74 3	12 17 6	...	8
(14)	8300	4542	472 8	1064 0	218 9 8	Nil.	

Summary.

	Number of policies.	Sum assured.	Additions after total extinction of premium.	Original annual premium.	Premium payable as reduced by bonus.	Average age at entry.	Average age at exit or at date.	Average duration.
		£	£	£ s. d.	£ s. d.	Years.	Years.	Years.
Claims by death	65	38800	5657	1211 16 11	309 18 11	38½	66	27½
Surrenders . .	6	3100	158	91 15 8	61 1 5	36	44	8
Arrears . . .	5	2150	...	61 2 1	61 2 1	32	34	2
Existing 30th Nov., 1872 .	14	8300	4542	218 9 8	Nil.	33½	76	42½
	90	42350	10357	1586 4 4	432 2 5	—	—	—

924	1500	1841-2.	29, 1, '38	6, 9, '41	47 5	51 1	3 8	Hemiplegia	Also No. 1289, £1000.
1288	1000		13, 9, '39	9, 12, '41	43 7	45 10	2 3	Hemiplegia	Gout.
783	600		24, 6, '36	2, 12, '41	24 7	30 1	5 6	Hydrothorax	
1782	200		13, 4, '41	18, 2, '42	47 11	48 9	0 10	"Induration of lungs"	
401	500	1842-3.	4, 11, '31	1, 6, '42	29 3	39 10	10 7	Phthisis	Also Nos. 532, £500, and 920, £500.
2095	500		10, 5, '42	26, 6, '42	42 9	42 10	0 1	Fever	Referred to Dr. Babington for psoriasis.
1885	500		28, 12, '41	7, '42	39 0	39 7	0 7	Fever	Female.
443	1000		14, 3, '32	5, 8, '42	30 0	40 5	10 5	Consumption	
1789	500		27, 4, '41	18, 4, '42	49 11	50 11	1 0	Disease of uterus	
526	800	1843-4.	31, 5, '33	2, '43	27 0	36 9	9 9	Consumption	
34	500		18, 3, '30	5, 1, '43	45 7	58 5	12 10	Apoplexy	Also No. 571, £50.
110	500		23, 4, '30	10, 4, '43	19 10	32 10	13 0	Phthisis	
2262	300		3, 1, '43	24, 5, '43	36 6	36 10	0 4	Cynanche	
578	600		28, 2, '34	1, 1, '44	38 9	48 8	9 11	Hæmoptysis	Also No. 1631, £300.
1260	500		9, 8, '39	12, 1, '44	41 2	45 7	4 5	Effusion in chest	
1006	100	1844-5.	17, 9, '38	9, '43	27 9	32 9	5 0	Hepatic	
1371	1000		27, 12, '39	16, 2, '44	23 8	27 10	4 2	Phthisis	
1658	2000		27, 11, '40	11, 4, '44	37 3	40 8	3 5	Inflammation of lungs	
1156	2000		12, 4, '39	7, '44	25 2	30 5	5 3	Phthisis	
160	1000		30, 6, '30	9, 10, '44	56 10	71 2	14 4	Cancer of rectum	
553	1000	1845-6.	29, 11, '33	1, 3, '45	34 9	46 1	11 4	Arachnoiditis	Also Nos. 1892, £500, and 2915, £500.
2158	600		16, 8, '42	8, 11, '45	30 7	33 10	3 3	Apoplexy	Also No. 2687, £1000.
1618	1000		17, 9, '38	21, 1, '46	46 0	53 4	7 4	Inflammation of stomach	
1138	1000		15, 3, '39	1, '46	40 11	17 9	6 10	Inflammation of lungs	
618	1000		27, 6, '34	4, 2, '46	44 4	56 0	11 8	Inflammation of bowels	
2525	500		14, 11, '43	12, 2, '46	33 10	36 1	2 3	Disease of chest	
2572	300		22, 12, '43	7, 2, '46	28 9	30 11	2 2	Consumption	

TABLE II—continued.

No.	Amt.	Date	Died.	Age.		Duration.	DEATHS. Cause of death.	REMARKS.
				Entrance.	Exit.			
	£	Dy. Mo. Yr.	Dy. Mo. Yr.	Yr. Mo.	Yr. Mo.	Yr. Mo.		
913	2500	30, 3, '38	2, '46	39 11	47 10	7 11	Consumption Hepatic	Also Nos. 1665, £100, and 2088, £300.
1522	500	15, 7, '40	18, 5, '46	57 2	63 0	5 10		
2585	400	2, 1, '44	26, 6, '46	53 11	56 4	2 5	Remittent fever	Surrender value paid, also No. 1073. Died at Kaab in Arabia without license.
1958	500	28, 12, '41	25, 6, '46	50 10	55 4	4 6	Fever	
632	...	26, 9, '34	26, 7, '45	27 10	38 8	10 10	Femoral abscess	
434	500	24, 2, '32	19, 2, '47	37 11	52 11	15 0	Effusion in pericardium	
2568	400	14, 12, '43	28, 1, '47	51 9	54 10	3 1	Suicide	Verdict, "Temporary insanity."
2309	2000	14, 2, '33	21, 4, '47	45 9	49 11	4 2	Inflammation of lungs	
343	700	27, 5, '31	10, 6, '47	52 11	60 0	16 1	Apoplexy	Bonus £316. Bonus £29; also No. 409, £500.
19	1000	12, 3, '30	11, 6, '47	39 11	57 2	17 3	Apoplexy	
18	500	12, 3, '30	3, 3, '47	57 10	75 4	17 6	Hydrothorax	Also No. 1922, £500. Also No. 3164, £250. Also No. 3224, £100. Jury assembled, but inquest not held.
20	1000	18, 3, '30	13, 12, '46	38 3	55 0	16 9	Softening of brain	
2902	5000	25, 2, '45	17, 9, '47	35 3	37 10	2 7	Asthmatic bronchitis	Also No. 1922, £500. Also No. 3164, £250. Also No. 3224, £100. Jury assembled, but inquest not held.
2301	1000	31, 1, '43	16, 10, '47	33 11	38 8	4 9	Erysipelas	
1454	1000	28, 2, '40	24, 11, '47	28 6	36 3	7 9	Diabetes	Also No. 1922, £500. Also No. 3164, £250. Also No. 3224, £100. Jury assembled, but inquest not held.
2906	200	11, 3, '45	10, 12, '47	50 10	53 7	2 9	Apoplexy	
2854	200	17, 12, '44	2, 11, '47	53 6	56 5	2 11	Hepatic	Also No. 1922, £500. Also No. 3164, £250. Also No. 3224, £100. Jury assembled, but inquest not held.
1686	1000	22, 12, '40	5, 2, '48	50 9	57 11	7 2	Sudden death	
3477	50	15, 6, '47	10, 12, '47	53 1	53 7	0 6	Apoplexy	Also No. 1922, £500. Also No. 3164, £250. Also No. 3224, £100. Jury assembled, but inquest not held.
1280	1000	13, 9, '30	22, 12, '47	39 0	47 3	8 3	Scirrhus of intestines	

	1818-9.										
	31, '46	3, '41	3, '46	1, '48	31, '10	33	8	1	10		
3173	300			1, '48	31, '10	33	8	1	10		
1728	400	9, '2, '41	13, '6, '48	42, '9	42, '9	50	1	7	4		Female.
1693	1000	12, '1, '41	31, '7, '48	32, '11	32, '11	40	5	7	6		
1425	1000	31, '1, '40	23, '6, '48	23, '11	23, '11	32	4	8	5		Buried at sea.
7	500	12, '3, '30	8, '48	51, '2	69, '7	18	5	18	5		
1639	1000	39, '10, '40	10, '8, '48	33, '6	41, '4	7	10	7	10		Also No. 2187, £500.
2119	1000	31, '5, '42	11, '9, '48	27, '11	34, '3	34	3	6	4		
1191	200	21, '5, '39	7, '11, '48	28, '7	38, '1	38	1	9	6		
1804	500	25, '5, '41	30, '8, '48	32, '11	40, '2	40	2	7	3		
544	1000	1, '11, '33	21, '1, '49	33, '9	48, '11	48	11	15	2		Also No. 2116, £500.
1943	400	7, '12, '41	8, '12, '48	52, '0	59, '0	59	0	7	0		
1263	1000	9, '8, '39	30, '7, '48	34, '0	42, '11	42	11	8	11		
											Paralysis
											Lumbar abscess
											Apoplexy
											Pudbisis?
											Climacteric disease
											General paralysis
											Consumption
											"Nervous delirium"
											Drowned
											Spinal
											Cerebral
											Malignant disease of kidneys

NOTE.—The financial year of the Society ends on the 31st of May.

Summary of Table II.

Total deaths in 20 years, 68.	Males, 65.	Females, 3.
Deaths according to years, in	1832-3	1
	1833-4	0
	1834-5	1
	1835-6	1
	1836-7	0
	1837-8	1
	1838-9	1
	1839-40	0
	1840-1	4
	1841-2	4
	1842-3	5
	1843-4	6
	1844-5	5
	1845-6	7
	1846-7	6
	1847-8	14
	1848-9	12
Total	68	—

Causes of Death in order of frequency.

Phthisis 16	Erysipelas 1
Cerebral 15	Diabetes 1
Digestive system . . . 9	Climacteric 1
Lung diseases, other than	Spinal 1
phthisis 7	Renal 1
Fevers 5	Uterine 1
Cardiac disease 2	Sudden death 1
Accident (drowning) . . 2	Unknown 2
Abscess 2	—
Suicide 1	68

This cannot be considered other than a favorable rate of mortality; especially does the remarkable scarcity of deaths in the early years bear evidence to the care employed in selecting the first lives, and also to the practicability, without elaborate papers of questions, of forming a generally correct estimate as to the value of individual proposals. The first ten years only give a result of one death in two years; and it is not until 1840 that the annual death rate mounts to the moderate figure of four. It remains within the decade until 1847, and the first twenty years only give an annual rate of between three and four deaths.

The medical questions at this date were singularly simple, five in number, asking respectively as to—1. Smallpox ; 2. Gout ; 3. “Asthma, fits, or any disorder which tends to shorten life ;” 4. “Violent inflammatory attacks, or spitting of blood.” 5. General good health. Some modern offices, which occupy four folio sheets with various medical queries and certificates, would probably stand aghast at this reticence. But it seems to have been more than sufficient for protection ; aided, doubtless, by a certain mutual intimacy of assurers and assured, and much also by the highly accurate and conscientious tone of the replies.

1. It is somewhat singular that in a constituency almost entirely male, the first death should have been that of a female. Indeed, for some cause which does not seem very obvious the proportion of female deaths during the early years was large. The cause of death is registered as consumption. The policy was begun in March, 1831, and death took place in same month of the following year. The assurer’s age at entrance was twenty-nine years five months, and at death thirty years five months.

On reference to later tables it will be found that this proposal was accepted in the most unfavorable portion of the female life, when its value is somewhat below that of a male life of the same age. According to the “Mortality experience of twenty offices” the female life at this age, twenty-five to twenty-nine, falls 49 below the corresponding male, although at later ages it is far superior.

2. The second death did not occur until July, 1834. The policy was taken out by a clergyman, aged thirty-six years eight months, and he died October, 1840, of consumption, having been three years four months a member of the society. Considering that the average duration of phthisis is from two to four years, there is good ground for the supposition that the disease may have originated subsequent to medical examination. At the same time it should also be noted that auscultation, our chief means of detecting early lung disease, was only made public about the time the society was started, and did not come into general use until later.

The third death occurred in February, 1836, being that of a clergyman, æt. forty-six years eleven months ; taken out in 1832, so that he had been four years one month in the society. He

was, according to the register, "thrown from his gig, and afterwards drowned." An inquest on the body returned a verdict of accidental death.

The two following cases are returned with cause of death unknown, probably in consequence of the still incomplete system of registering deaths existing at that time. The sixth death did not occur till 1840; it was owing to consumption occurring rather late in life, within a month of sixty years. As in this year a regular death rate seems to have begun, we need not pursue single cases any further.

The earliest deaths after completion of the assurance are as follows:—

Duration.		Age at death.		Cause of death.
Years	Mos.	Years	Mos.	
0	1	42	10	Fever.
0	4	36	10	Cynanche.
0	6	53	7	Apoplexy.
0	7	39	7	Fever.
0	10	45	10	Inflammation of bowels.
0	10	48	9	"Induration of lungs" (Phthisis).
1	0	50	11	Uterine.
1	0	30	5	Consumption.

The only diseases which occur twice are fever and phthisis; for under this heading no doubt the vague return of induration of the lungs should be classified.

On examining the diseases to which death was due, we find even more than the usual large predominance of phthisis, to which sixteen are attributed. If we add the number seven, due to other lung affections, the total of twenty-three represents a fraction more than one third of all the deaths.

The sixteen phthisical cases represent a total of 104 years eight months of life, which only gives an average duration of six and a half years to each life. The average of twenty-three cases is substantially the same. It is not uninteresting to extract these deaths from the general table, and place side by side the duration of the policy and the age at death.

Cases of phthisis.

Duration of policy.		Age at death.	
Years.	Mos.	Years.	Mos.
1	0	30	5
3	4	40	0
9	11	59	11
0	10	48	9
10	7	39	10
10	5	40	5
9	2	36	9
13	0	32	10
9	11	48	8
4	2	27	10
5	3	30	5
2	3	36	1
2	2	30	11
7	11	47	10
8	5	32	4
6	4	34	3

One only of these deaths occurred below thirty; nine between thirty and forty; five between forty and fifty; one, as above noted, at the end of the sixth decennial period.

The fifteen cerebral cases give a total of 120 years four months of life which furnishes an average of eight years for each life. It is probable that the number here tabulated is hardly sufficient to give a fair estimate, and that the whole mortality of the society for brain diseases will prove much more favorable. Certain forms, indeed, seem a natural termination of aged lives, and therefore figure more in the later statistics.

The deaths from diseases of the digestive system are too few for numerical analysis, and are chiefly remarkable as consisting of what may be termed adventitious disorders rather than any of the principal morbid processes in this department. There are three hepatic, two malignant cases and one of cynamche. Fevers give a total of five cases, one being remittent. Cardiac disease gives the remarkably low number of two, abscesses, accidents, and unknown causes of death being of similar amount. Other diseases appear singly or are entirely absent. With regard to this latter point it is worth notice that so common a complaint as bronchitis only appears once on the table, and that gout, hernia, and renal affections are absolutely unrepresented, the only renal case being distinctly reported as

malignant. There are no doubt good reasons why Bright's disease should not figure in the table during the earlier years ; but its absence farther on is worthy of comment, considering that in the ordinary average of hospital practice it does not rank far in frequency below phthisis and other chest affections.

Beyond this for the present we do not propose to go. The few remarks which we have felt justified in making tend not only to commemorate the early experience of an office now ranking among the older institutions of its kind, and second to none in prosperity ; but they will enable us in a future communication to assume, from the specimen here exhibited, that the facts on which we base our observations, though presenting a favorable average, are not entirely or in kind exceptional. Although the society still numbers among its ranks, after an existence of over forty-two years, a considerable body of its original assurers, and though the mortality for the first ten years was marvellously small, still there was a fair number of the usual mishaps which it is the special province of assurance to meet and provide for ; and there is clear evidence that the problem was boldly and honestly grappled with. The guarantee fund, still existing in name, which, in the early years of the Society's operations, was a very real protection, and practically equivalent to the paid up capital of a proprietary office,—except that no interest was payable upon it,—shows that no undue expectations of success were formed ; and the fact that it has never from first to last been approximately introduced or even thought of, is proof of careful painstaking selection of lives, and cautious investment of funds from the very commencement. It is a satisfaction to know that the founder and first secretary, himself one of the earliest assurers, holding policy No. 28, and one of the very best lives recorded in these tables, was able in his eighty-first year to behold the entire success of his early labours.

ON SOME OF THE
COMPLICATIONS OF STRANGULATED
HERNIA AND THEIR DIAGNOSIS.

By F. CHURCHILL, M.B., F.R.C.S.

AUTHORS of systematic works on surgery have very carefully described and detailed the symptoms, diagnosis, and treatment of each variety of hernia. The importance of an accurate definition of this complaint is obvious from its frequent occurrence under varying circumstances of urgency and in a great variety of situations, especially in relation to certain recognised openings or weak parts in the abdominal wall. Surgical writers have also laid down rules for distinguishing hernia from other swellings of an entirely different nature occurring in the same situations. I need only refer to the valuable monographs of Sir Astley Cooper, Lawrence, and Wood to indicate the comprehensiveness of existing treatises on this subject. Nevertheless it has occurred to me that while great stress has been laid upon the importance of distinguishing between the varieties of hernia in a quiescent state, and the tumours or swellings simulating hernia, the indications for determining the existence of strangulation and the conditions most resembling it have not been so clearly defined. The practitioner cannot obtain an adequate knowledge of the ever varying conditions of individual cases and their complications, if relying mainly upon the theoretical and sharply defined definitions to be found in the books, with reference to the diagnosis of swellings in hernial canals.

For instance, a hernia is described usually in general terms as follows:—a soft tumour having a definite situation with reference to some aperture or weak part of the abdominal wall, appearing suddenly, receiving an impulse on coughing, having a tendency to enlarge after any exertion, gurgling under pressure and capable of complete reduction when there is no impediment to its return into the abdomen. When such physical signs are present there can be no doubt as to the true nature of the swelling. Cases, however, where an accurate and speedy diagnosis is imperative are usually much more obscure. In strangulated hernia there is often no impulse on coughing, no tendency to enlarge, no gurgling, and no possibility of reduction by the taxis.

In classifying hernial tumours for statistical purposes I have been in the habit of including under the head of strangulated hernia all those swellings properly called hernia where the contents have been subjected to such an amount of constriction as to give rise to symptoms of strangulation irrespective of the means employed for remedying this condition. Several cases of hernia came under treatment in which all the most urgent and alarming symptoms of strangulation were present, such as stercoraceous vomiting, but under tentative treatment, warm baths, icebag, and the taxis, the swelling was reduced and the symptoms relieved without necessitating any resort to operative interference.

Three or four interesting and at the same time very instructive cases have recently come under my notice at St. Thomas's Hospital, when doing duty for Mr. Wagstaffe as Resident Assistant Surgeon. In all of these the history and physical signs were masked and obscured by concurrent complications. Symptoms which usually indicate strangulation were undoubtedly present, but it was manifestly impossible to form an accurate diagnosis upon these alone.

By the kind permission of the Surgeons I am enabled to publish their cases to illustrate these remarks upon some obscure points in the diagnosis of strangulated hernia, especially with reference to the occurrence of other swellings in the same situation. It is more particularly when a hernia, abscess, or hydrocele coexist that these difficulties occur.

CASE 1.—Abscess of vaginal sheath of spermatic cord; exploratory operation; recovery.

J. M—, æt. 44, first noticed a swelling in the inguinal region twenty years ago, after lifting some heavy iron work at the foundry where he was employed. He did not pay much heed to the swelling at the time, for he had no difficulty in reducing it by manipulation. Months after this he purchased a truss because the hernia always came down after any slight exertion. He has worn out four trusses since that time, and all of these were well adjusted. Occasionally, however, after severe straining the hernia would come down behind the truss, and then he found it very difficult to reduce it. On one or two occasions he had to give up work for a few days on account of severe pain in the scrotal tumour and inability to reduce the rupture. Sometimes he had attacks of retching and sickness. These symptoms passed off after a few days' rest in bed. In the middle of July of the present year, or three weeks before admission to St. Thomas's, another attack of retching and sickness supervened, and there was also some constitutional disturbance. On the evening of the third day he succeeded in reducing the hernia and returned to his work the next day.

As soon as he resumed work the symptoms of obstruction returned. He then applied for admission to the Hospital. A warm bath heated up to 102° was administered and the urgent symptoms were much relieved. An icebag was applied to the tumour as soon as he was put to bed, and it was then ascertained that there was a large heavy uniformly oval or pyriform tumour occupying the lower part of this side of the scrotum, distending it to the size of an infant's head. By careful manipulation an ill-defined furrow or line of demarcation could be traced separating the two swellings, and the upper swelling was softer and more yielding, suggesting the idea that there might be a piece of strangulated omentum lying in the inguinal canal. Two or three days later it was found that the whole mass had increased in size, and this line of demarcation had disappeared. The scrotum was becoming tense, red and swollen, and the patient complained of tenderness over the inguinal canal. Still there was nothing to indicate strangulation, and the man's condition, though somewhat unfavorable, did not seem to call for operative interference. There was some feverishness, but no sickness. It was noticed that the patient was pale and languid, as though suffering more than he appeared to be. He had a small thready pulse, a high temperature and a mottled hue on the cheeks. Twelve hours later the scrotum became very œdematous, red, and tender. Mr. Sydney Jones, suspecting that suppuration had occurred in or about the sac of an old hernia, proceeded to explore the scrotal tumour. A free vertical incision exposed the distended tunica vaginalis, which was opened up, and the hydrocele evacuated. The incision was prolonged upwards over the external ring. A very large quantity of dense very adherent infiltrated tissue had to be cut through before the sac was opened, and then it was found that the elements of the cord were much condensed, matted together, in parts sloughing, and surrounded by a circumscribed abscess. In separating these adhesions the cord was divided and about two ounces of very fœtid pus evacuated. It was at first supposed that the infiltrated tissue was originally a piece of omentum, the structure of which had become entirely changed by the inflammation around it.

Mr. Sydney Jones examined the ring and inguinal canal very carefully lest a small knuckle of strangulated intestine should be wrapped up in this inflammatory material, but the canal was quite free. The upper margin of the internal ring was somewhat tense, and this was divided with a hernia knife, but there was no undue pressure upon the contents of the inguinal canal.

This exploratory incision sufficed to relieve all the urgent symptoms, and the wound was kept partly open to favour the separation of sloughs. During the after treatment great care was necessary to keep the wound as free as possible from pent-up discharge of a most offensive character. The interior of the sac was syringed out with chloride of zinc lotion (ʒij of the liquor to the ounce), and peat charcoal dusted over the surface. The dressings were frequently removed and the wound, though very sloughy, kept as clean as possible. The patient made a good but slow recovery, the wound gradually closing over the testicle, which did not slough.

Mr. Wood in his work on ruptures states that "In hernias of long standing, especially scrotal, the sac contracts intimate vascular connections with the cord and scrotal coverings. These vessels are supplied almost entirely from external parietal sources, and the sac itself thus becomes almost independent of its source, the peritoneum, and if the vascular connections with cord, &c., are not established, mortification is likely to ensue." This may have been the cause of the circumscribed abscess in the case above detailed.

Various swellings which occur in the inguinal region must be distinguished from ruptures; such are hydrocele varicocele, inflammatory swelling of the spermatic cord, arrest of the testicle at the abdominal ring, collections of fat in the cellular tissue of the spermatic cord, and circumscribed abscess.

Hydrocele of the tunica vaginalis can only give rise to doubt when it encroaches upon the inguinal canal. The special characters of a hydrocele are its pyriform shape, its translucency, the ponderous nature of the tumour, the absence of cough impulse, and the existence of fluctuation. In hydrocele the cord is usually obscured by the tumour. If the communication with the abdominal cavity remains patent it will be possible to press back the fluid and reduce the swelling; the fluid will return if the patient coughs, but not with the same tardiness and characteristic jerks of a free and reducible enterocele.

In simple hydrocele the tumour is situated below and outside the abdominal ring, and in drawing the hydrocele down the cord may be felt quite free, as also the whole course of the inguinal canal. Diffused hydrocele of the cellular tissue of the

cord may be mistaken for an omental rupture, but the former is broader below than above, and is very elastic. If the bottom of the hydrocele be pressed the fluid gently rises towards the apex and expands it, not so with omentum; if within the abdominal ring, the fluid pressed up from below will distend it. A hydrocele is smoother and has a more regular outline; it commences to form from below upwards, gradually increasing in size; its transparency is, as a rule, pathognomonic. In those rare cases of hydrocele commencing in the inguinal canal and descending down into the scrotum the tumour may be felt circumscribed and the cord quite free.

It is often difficult to distinguish hydrocele of the spermatic cord from an oblique inguinal hernia. These swellings sometimes disappear more or less when the patient lies down. When the tunica vaginalis reflexa covering the upper part of the cord within the pillars of the external ring is affected the tumour may be mistaken for a buboncele. In this case the valuable test of translucency cannot be had recourse to. Often these swellings may be pressed down by manipulation, and if not protruded outside the ring the cord may generally be felt to roll freely beneath the finger above the swelling. Diffused hydroceles of the spermatic cord are more frequently met with in children.

Varicocele resembles a reducible hernia, especially the omental variety, in many particulars, and may complicate it. When free the distended veins may be felt as a bunch of worms rolling between the finger and thumb. A varicocele usually terminates at the ring, which is free and extends down to the testicle, where it is largest. These distended veins surround the cord and may easily be separated from it.

A glandular tumour may resemble an incomplete hernia, but when occurring in the inguinal region it is generally superficial and has no definite relation to the inguinal canal. It is more movable and of firmer consistence than a hernia. Glandular swellings are generally multiple, and are the result of some irritation elsewhere with a history of gonorrhœa, syphilis, struma &c. Occasionally the lymphatics in the inguinal canal alone are involved and not the superficial glands. In this case there will probably be disease of testis, or cord of a tubercular or cancerous nature rendering the diagnosis simple.

Inflammatory swellings of the spermatic cord may follow blows or strains. The swelling is elastic, tender, and painful. There is some feverishness with pain of a dragging character in the lower part of the abdomen, and generally some sickness. If there has been a previous history of hernia the diagnosis becomes very difficult. A chronic abscess presenting at the abdominal ring, which returns within the abdomen when the patient assumes the recumbent posture, is a condition most liable to be confounded with a reducible hernia, but in this case the previous history and general characters of the swelling would be sufficient as a rule to distinguish it. Abscesses pointing in this situation are generally connected with the ovary or round ligament. Mr. Croft operated upon a patient with chronic abscess protruding through the external abdominal ring, in close relation to the round ligament. The abscess was punctured and evacuated under the carbolic veil; a quantity of flaky pus escaped. The sac of the abscess was afterwards injected with iodine. She had no bad symptoms and no return of the swelling while she remained in hospital. There was no disease of spine, but the localised tenderness over the right ovary seemed to indicate inflammatory mischief about the broad ligament.

An undescended testicle cannot readily be mistaken for hernia; its size and shape, its mobility, the peculiar sensation excited by pressure, and especially the absence of the testicle from the scrotum, will generally suffice to distinguish it. If there should also be a hernia or hydrocele in this situation there may be some difficulty. An attempt should be made to isolate the two swellings and examine each separately with regard to cough-impulse, elasticity, &c. There is some arrested development of scrotum on the side of an undescended testicle with a characteristic and striking want of symmetry on the two sides.

Collections of fat may appear in the cellular tissue of the spermatic cord or in the subserous fat of the peritoneum closely resembling an omental hernia. Fatty masses developed in the substance of the cord are less liable to be impressed with a cough impulse. By passing the finger within the external ring behind the tumour and pressing upwards upon the external ring no true dilating impulse will be felt, and there will be no obstruction at the internal abdominal ring.

The vas deferens may become sacculated by the expansion of

a diverticulum usually to be found at the lower part. A true cyst may form in the testicle in connection with the vas deferens, but in both these cases the upper part of the cord and inguinal canal will be quite free.

Cysts developed from the body of the testicle or its appendages usually contain an opalescent fluid abounding in spermatozoa. These when uncomplicated may be easily diagnosed, but I will here append the notes of a case admitted to St. Thomas's Hospital under the care of Mr. Mac Cormac, for a large strangulated scrotal hernia on the right side, and a spermatocele on the left. A warm bath was administered, and I then attempted to reduce the hernia while the patient was in the water, and also when he returned to bed, but without success. An icebag was placed over the tumour, and a few hours later the patient succeeded in reducing the hernia by manipulation. It was now ascertained that he was also suffering from a spermatocele on the left side of thirty years' duration. The history was as follows:—

CASE 2.—Strangulated scrotal hernia and spermatocele; hernia reduced; tumour of testicle cured by paracentesis.

W. S—, æt. 64, was straining to lift a picture off the wall, when he suddenly felt a severe pain in the left testicle. The next day the testicle was very painful and much swollen and there was a distinct prominence at the lower part about the size of a hazel nut. The swelling gradually increased up to the time of his admission to the hospital, but it has not inconvenienced or pained him since the first attack.

Soon after admission it was found that the left testicle and its surroundings were considerably enlarged being about the size of a turkey's egg with a prominence towards the lower part. There was no difficulty in proving the cystic nature of this growth for it transmitted light at the lower part. Though generally ovoid it was somewhat irregular in shape and appeared to be connected more particularly with the epididymis. The vas deferens could be isolated from the rest of the cord, and appeared quite normal.

A puncture was made with trocar and canula through the transparent part, and about ten ounces of a clear straw-coloured fluid drawn off, containing abundance of spermatozoa. The fluid reaccumulated in the cyst and there was some subsequent orchitis. The testicle was strapped and elevated with a pillow. Paracentesis was again had recourse to and about half a pint of fluid evacuated, some of which was quite clear. By passing the trocar into other loculations of this compound cyst pus was evacuated. He remained under treatment for some weeks, the swelling of testicle gradually subsided, and there was no more trouble with the hernia on the right side, although it protruded as usual after any exertion. He left the hospital with a properly fitted truss.

The essential characteristic of a hernial protrusion, when not strangulated, is the peculiar distending impulse on coughing. If a tumour exist on the surface of the groin or connected with its aponeurotic structures, the impulse may be communicated in the same direction, but without any lateral expansion. The dilating impulse of a hernia may be compared to that of an aneurism, either of which may be distinguished from the pulsation impressed upon a tumour placed in mere contact with the artery.

A case illustrative of this difficulty in diagnosis was recently admitted to St. Thomas's Hospital under the care of Mr. Croft.

CASE 3.—Periosteal pelvic tumour in contact with and pressing forward the femoral artery; relieved.

A. B—, æt. 64, had noticed a pulsating swelling in the left groin, which on a cursory examination was thought to be an aneurism of the femoral artery, but by carefully manipulating the tumour it was found that there was no lateral expansion, and that the pulsation though very obvious was confined to the central and anterior part, and in direct continuity with the femoral artery below the swelling. The diagnosis, therefore, formed was that a deep-seated tumour, probably connected with the os innominatum, was pressing forwards and rendering unduly prominent the femoral artery, which was in other respects normal. The inguinal canal was quite free.

Having illustrated some of the conditions which might give rise to doubt with respect to the diagnosis of inguinal swellings, I come now to the more immediate object of my paper—the description of cases of hernia, and the symptoms of obstruction to indicate some of the hindrances to a correct diagnosis when concurrent complications mask or obscure the existence of strangulation.

The premonitory symptoms and the conditions favouring strangulation are in the majority of cases as follows:—An old hernia either large or small suddenly becomes swollen in consequence of a greater mass protruding through the ring, or because the contents of the sac are subjected to undue pressure or constriction, so that the contained parts are disproportioned to the capacity of the sac, or to the calibre of the opening in the abdominal parietes, or to the neck of the sac through which the hernia protruded. The unyielding nature of these tendinous fenestrated apertures or canals causes undue pressure or constriction of the contents, and the functions of the bowel are interfered

with. This interruption to the free passage of intestinal fluids and the consequent vascular engorgement speedily gives rise to untoward symptoms; severe abdominal pain, tormina, antiperistalsis and subsequent rejection of the intestinal contents above the seat of constriction. The general circulation becomes hurried, the pulse sharp and wiry, and there is great anxiety depicted on the countenance. The damage to the bowel may be so considerable that it is no longer able to perform its functions, the constricted portion loses its vitality, it changes colour, becomes infiltrated, sodden, and the lustre of the surface disappears; gangrene speedily sets in beyond the hope of recovery.

When the mortification has advanced so far as to threaten perforation and extravasation of contents, a quantity of inflammatory material is generally thrown out about the neck of the sac so as to close more or less completely the communication with the general serous cavity. The bowel being firmly grasped by the stricture becomes indented and threatens perforation. In the advanced stage of strangulation the symptoms become very distressing, the countenance is pinched and anxious looking, the surface of the skin is cold and clammy, the breathing is laboured, *alæ nasi* active, abdomen distended or tympanitic and local tenderness increases. The vomiting which has continued unceasingly now assumes a stercoraceous character, and there is troublesome hicough. Unless operative interference is had recourse to a fatal termination speedily ensues. As soon as gangrene has set in the urgency of the symptoms abates, and the patient is under the delusion that the case has taken a favorable turn. Syncope and alarming prostration soon follow and death closes the scene.

Another point which I am anxious more particularly to bring out is that obstruction of the bowel and peritonitis may occur in a person the subject of hernia, but quite independent of the hernial swelling. In many cases alarming symptoms are set up by the return of a knuckle of intestine within the abdomen more or less damaged by constriction or compression. In the same way peritonitis or local obstruction may occur where there is merely the coincidence of a hernia either reducible or irreducible lying in a sac quite free from all causes of constriction or obstruction. The following case illustrates this form of complication.

CASE 4.—Pyelitis; abscess of kidney; perityphlitis; irreducible hernia; exploratory operations; death; autopsy.

A. B—, æt. 45, a grocer, admitted to St. Thomas's Hospital under the care of Mr. Sydney Jones, overlifted himself carrying bags of sugar from one warehouse to another. It is only during the last six years that he has suffered any inconvenience from it. Seven years ago he had an attack of "pleurisy" on the right side, and this was followed by an abscess in the right mammary region, which was incised and pus evacuated. Six months later he bruised the hernial tumour jumping off a cart when in motion, and since that time he has complained occasionally of pain and tenderness in the scrotal tumour with more or less frequent attacks of malaise and sickness. He however continued regularly at his work up to the time of admission to hospital. There were no very urgent symptoms, and it was surmised that the pain was caused by constriction of an old omental hernia. Icebags were constantly employed, and he was kept on milk diet. In about two days the hernial tumour had almost subsided, all tension and swelling were relieved, and the external ring could be defined without any difficulty. He now began to complain of pain of a gnawing character in the right flank, which increased in severity (the hernia was on the left side).

This continued to be his most troublesome complaint. Large poultices were applied all over this side and some liquor vesicatorius was painted over the tender place in right flank. Some fine crepitation was detected over the base of the right lung, and it was suspected that there was a relapse of the old pleurisy. The symptoms increased in severity. Abdomen became gradually more distended, the breathing more laboured, pulse rapid and small. The local redness and tenderness increased and there was considerable œdema all up this side as far as the axilla.

Suspecting but scarcely able to detect by fluctuation a deep-seated abscess, in Mr. Sydney Jones's absence I passed an exploratory trocar into the right flank for three or four inches. A small quantity of turbid serum escaped, but this was thought not sufficient to justify a free incision, although I was satisfied that there was pus in this situation. There was great risk of wounding kidney or ascending colon. I then decided to cut down upon the hernial sac, to ascertain whether the distressing sickness, abdominal tumefaction and distension, and severe constitutional disturbance were caused by adhesions or constriction at the internal ring. A quantity of firmly adherent omentum was found in the sac, but as the abdominal ring was quite free so as to admit the passage of the index finger through to the abdomen, I did not open up the sac. It was evident that there was no strangulation within. The wound was closed up and the patient returned to his bed.

The bronchial irritation and dyspnoea increased and the breathing became very laboured. He died the following morning.

The cause of death was pyelitis. The post-mortem examination revealed a most interesting and complete verification of the diagnosis formed as respects the existence of a deep-seated abscess in close proximity to the cæcum. It was strange, how-

ever, to find the right kidney so extensively involved without any indication during life of albuminuria. It is not unlikely that the communication of the ureter with the pelvis of the kidney was for the time being blocked up. The duct, although patent, was compressed. There was no calculus or anything found at the autopsy to substantiate the assumption that the abscess was the result of mechanical obstruction. I have obtained the following particulars from the post-mortem records:

Body well nourished. Subcutaneous fat and omental adipose tissue in excess. Chest cavity encroached upon by the abdominal contents, which were bulky—the intestines much distended, and liver very large. Right lung bound down to chest wall by old firm adhesions throughout most of its extent, sparingly crepitant and much congested. Left lung congested but freely crepitant. No œdema pulmonum. No fluid in pleural cavity. Heart normal. Aorta slightly atheromatous. Liver projected two inches below the ribs. Hepatic dulness extended to the level of the right nipple. Substance firm, commencing fatty degeneration. A small patch of recent lymph on under surface, where in contact with right kidney and ascending colon. Spleen large, pulpy. Right kidney enclosed in a thickened adherent capsule, the posterior surface of which formed part of the wall of a large diffuse abscess surrounding the kidney and involving the retroperitoneal tissue in this locality. Pus could be traced down upon the sheath of psoas, and the ureter was surrounded by a quantity of inflammatory material which partially or entirely blocked it up. There were two circumscribed abscesses in the tubular portion communicating with the pelvis of the kidney. The cæcum and ascending colon were bound down to the peritoneum, covering capsule of kidney by some soft recently formed lymph. There was no peritonitis elsewhere, and no fluid in peritoneal cavity. The ileo-colic valve was natural, there was no ulceration or stricture of intestine, and no obstruction of the appendix vermiformis. The scrotal hernia on the left side contained some firmly adherent omentum and a portion of sigmoid flexure of colon. There was no impediment to the return of the bowel, and the coats of the intestine were quite natural. There was no evidence of caries of rib or spine.

A case of abscess in connection with an old umbilical hernia also occurred about the same time at St. Thomas's Hospital under the care of Mr. Simon and Mr. Mason. The history of the case was as follows:

CASE 5.—Abscess of sac of old umbilical hernia; incision; recovery.

L. G—, æt. 58, married, a very stout loosely made woman with prominent belly, and sluggish capillary circulation, most marked about the face. First noticed a small lump above the umbilicus after lifting a heavy weight some years ago,

This slight swelling did not increase in size. Three weeks before admission she began to complain of pain and tenderness in this situation. She had no sickness, hiccough or constipation. There was much localised tenderness, but no abdominal pain. The integument over the swelling had thinned, and was stained of a dark colour. There was some diffused redness around, fluctuation very distinct.

Mr. Wagstaffe, who first saw the case, carefully incised the swelling, and some turbid serum escaped, followed by a mass of congested omentum. The sac was explored, and a stricture at the neck divided upwards with a hernia knife. The edges of the ring were brought together by catgut ligatures. Wire sutures were applied to the superficial wound. Portions of the congested omentum sloughed, and there was some very offensive pus escaped from the wound after this operation, and this continued for two or three weeks. Syringing with chlorinated soda lotion was continued daily, and the wound ultimately closed. The bowels were kept open by enemata. There was some threatening of peritonitis at one time, the temperature averaging 100° in the morning and 101° in the evening, with a sharp quick pulse. She left the hospital quite cured.

The hernial sac, like other membranes, may be thickened and indurated, the effused lymph becomes organized and acquires a firmer texture; by this means omental herniæ may undergo a natural cure.

In conclusion, I beg to tender my grateful thanks to the surgeons for so kindly permitting me to make use of their cases to illustrate a subject which, as opportunity may occur, I shall hope to make more complete.

CASE OF

INJURY TO THE SYMPATHETIC NERVE

IN THE NECK.¹

By J. F. PAYNE, M.B.

THE subject of the following observations was a child, named Arthur B—, aged fifteen months, brought to me at the Hospital for Sick Children, as an out-patient, on September 22nd, 1870. He was suffering from rickets and diarrhœa, complaints which need not here be regarded. On first seeing the child, I was struck by the marked difference between the two eyes and the two sides of the face. The left side of the face had a peculiar and, so to speak, faded appearance. The left eye was distinctly smaller (that is, as regards the palpebral fissure) than the right. It was surrounded by some lividity, and looked wasted, or, more accurately, a little sunk in the head, since on careful examination there appeared to be no difference in the size of the globe. The pupil of the eye was decidedly smaller than the right, but when shaded from the light expanded. The eye was also dull and seemed insufficiently provided with moisture. Although the partial closure of the eye gave the appearance of ptosis of the upper lid, nevertheless no paralysis could be detected of this or of any other muscle of the face. The complexion, though not very strikingly different from that of the other side of the face, was nevertheless somewhat pale and livid; only it must

¹ Some account of this case was given to the Harveian Society.

be remarked that the child being sickly and badly cared for, neither cheek was rosy or clean.

It was clear, then, that the left side of the face showed undoubted deviations from the normal state of things, and formed a decided contrast to the right side.

Moreover, on examining the right side, this could not be pronounced perfectly normal; only its deviation was in the opposite direction to that of the left. The right eye was watering a good deal at the time, though free from any source of irritation, and I was told that it commonly did so. It looked larger (that is to say, the opening of the eyelids was wider), and it was certainly slightly more prominent than the left. The pupil was considerably larger. I also noticed that there was a running from the right nostril, and was told that was constant; there was none from the left. No difference could be seen between the two halves of the mouth or tongue, or between the teeth on the two sides. I was at first inclined to think that the hair was more scanty on the left than on the right side, but on a second examination it appeared that the difference was extremely slight, if any; no other difference could be seen in the nutrition of the two halves of the head. There was one point, and that perhaps the most important of all, on which I must confess that I have no information, and that is the comparative temperature. Under ordinary circumstances the two sides appeared to the hand quite equal in this respect; but the mother believed that the left side was usually the hotter. The attempt to apply a thermometer to the ears of the little patient was a failure, though it led to certain results which will be mentioned presently.

The mother gave me in addition an account of certain appearances sometimes seen which seemed very strange indeed. She declared that when the child became hot, excited, or from any cause flushed, the right side of the face only became red, while the left remained pale, or even, as she said, of a greenish colour. The right side only would sweat under any circumstances, the left remaining quite dry.

This was all that I could make out at the first examination. On the second occasion on which I saw the child I had an opportunity of confirming the reports given by his mother as to the singular appearance which his face presented under the influence of ex-

citement. He was slightly excited and heated when brought into the room, and the attempt to apply a thermometer behind his ear excited at the same time his anger and his vasomotor system in such a way as to produce a singular physiological antithesis in the two sides of his face. The right was flushed and perspiring, while the left remained dry, pale, almost livid, and had possibly from the mere optical suggestion of the complementary colour, a decidedly greenish hue. The left eye, instead of weeping and sparkling like the right, retained a dry and lacklustre appearance. A sharp line of demarcation precisely in the middle separated these two conditions, so singular was the spectacle that one was reminded of those optical arrangements by which the field of a polariscope is divided into two halves, one pink, the other green.

It was, however, quite clear that it was useless to try and take the temperature in a state of quiescence, since the very attempt to do so caused the infant to pass into a state of excitement, and for this state of excitement itself no thermometer was needed to show that the one side was at all events considerably hotter than the other. The child was only brought to me once more.

When, however, a few months later I sought him out in his home, in one of the dirtiest and most disreputable purlieus of the Seven Dials, the difference in appearance of the two sides was less striking than it had been before. The only history I was able to get was as follows:—

The child is said to have presented from birth the same inequality in the two sides of the face; and the friends could not remember that the appearance had ever been different from what it was at the time of my observations. Its birth had been a difficult one. The face presented and the mother was a week in labour. Finally, the child was extracted by means of instruments, and its head was believed to be injured. They thought that the head was bent down upon one shoulder, but which shoulder they could not say. No mark of injury, it should be said, could be found on the child's head or neck. Before discussing the cause of these singular anomalies, it may be well to summarize the chief physiological features of these cases.

Both sides of the face were evidently abnormal, but presented the following points of contrast with one another.

Left Side.

1. Permanent anaemia.
2. No hyperæmia on excitement.
3. Secretion (of conjunctiva, nose, sweat-glands) ordinarily below, or at least not above the normal quantity; not increased on excitement.
4. Opening of eyelids smaller than the normal; with *apparent* ptosis.
5. Eye sunk in the head, surrounded by some lividity.
6. Left pupil very small; smaller than right, and apparently abnormally contracted.
7. Skin and subcutaneous tissue generally looking flabby and morbid.

Right Side

1. Usually normal amount of vascularity.
2. Marked hyperæmia on excitement.
3. Secretion ordinarily excessive; increased on excitement.
4. Opening of eyelids normal in size.
5. Eye normal in position; not over prominent.
6. Pupil larger than left, but apparently quite normal.
7. Skin and subcutaneous tissue looking plump and elastic.

In the following respects no difference could be perceived between the two sides, viz. in the development of the teeth, condition of the tongue, lips, or mouth; size and general nutrition of the parts. The condition of the hair was doubtful.

There could hardly be any doubt that these symptoms were owing to some affection of the sympathetic nerve in the neck; the question, however, was, whether the nerve on both sides was affected, or whether the alterations on one side were primary, on the other secondary; if so, which was the primarily affected side, and finally, of what nature was the original affection. The hypothesis of an affection of the nerve on both sides of the neck simultaneously is obviously the most complex that could be made, and on the principle of economy must be rejected if a more simple one will do. We have, then, to consider the possibility of an affection of one side producing changes on both sides.

I am not sure that I at least should have been able to suggest a sufficient theory on this basis were it not for a remarkable article by Dr. William Ogle, published in the 'Medico-Chirurgical Transactions' for 1869 [vol. lii, p. 151]. He has there described a case somewhat similar to this, and has not only analysed it with great precision and ability, but further illustrated his views by a large number of facts, mainly experimental. Briefly, his case was that of a man in whom the cervical sympathetic

on one side had been injured and effectually severed by an abscess, and who presented in consequence increased temperature and contracted pupil, with almost absence of sweat and salivary secretion, but no marked hyperæmia on that side. While in conditions of excitement the conditions were reversed, the usually normal side becoming hyperæmic, and showing increased secretion. The temperature was normally higher on the side of the nerve injury, but in conditions of excitement the unwounded side became hotter. The deficiency of saliva on the affected side was so marked as to be a source of trouble to the patient, and no means whatever, not even a Turkish bath, produced any sweating on that side of the head or neck. Narrowing of the palpebral fissure and *apparent* diminution in the size of the eyeball were also noticed; there was no paralysis of voluntary muscles. No changes in the way of atrophy or hypertrophy could be detected.

These peculiarities Dr. Ogle explains by supposing the nerve injury to be in the stage which always occurs, sooner or later, after the section of the cervical sympathetic, when the hyperæmia disappears wholly or nearly, while the other changes remain. He has given parallel instances from experiment both of the normal conditions and also the reversal of the relations of temperature in consequence of excitement.

On the same principles we must conclude that the cervical sympathetic of the left side in the present case must have received (probably at birth) an injury amounting to severance; that this in all probability first of all produced hyperæmia, increased secretion and contracted pupil of that side (though of that stage there is no record or evidence), and that this stage was followed by the condition which became permanent of an anæmia, deficient secretion, and contracted pupil. With respect to the right side, I presume that the sympathetic was there uninjured, but that the increased secretion and possible tendency to hyperæmia resulted simply from the affection of the other side; in fact, that the left or pale side was essentially the morbid one; the right or sometimes hyperæmic side being nearly normal.

For the sake of completeness I will also mention the cases recorded by the American surgeons in their work on gunshot wounds.¹

¹ Mitchell, Morchouse and Keen, 'Gunshot Wounds and other Injuries of Nerves.' Philadelphia, 1864.

The only case described as one of injury to the sympathetic is as follows :¹—

CASE.—E. M—, æt. 24, was standing erect when a ball entered his right neck one and a half inches behind the ramus of the jaw at the anterior edge of the sterno-cleido-mastoid muscle, and emerged half an inch in front of and immediately below the angle of the jaw on the left side. . . . About a month after he was hurt, a comrade noticed the peculiar appearance of his right eye, and called his attention to it. A little later it began to be troublesome in bright lights, and has remained so ever since, with of late some change for the better.

Present state.—The pupil of the right eye is very small, that of the left eye unusually large. There is slight but very distinct ptosis of the right eye, and its outer angle appears as though it were dropped a little lower than the inner angle. The ball of the right eye looks smaller than that of the left. These appearances existed whether the eye was open or closed, and gave to that organ the look of being tilted out of the usual position. The conjunctiva of the right eye is somewhat redder than that of the left, and the pupil of the right eye is a little deformed, oval rather than round. In a dark place or in half lights the difference in the pupils was best seen : but in very bright light, as sunlight, the two pupils became nearly of equal size. The left eye waters a good deal, but has the better vision, the right eye having become myopic. . . . After exercise his face became distinctly flushed on the right side only and pale on the left. The flush extended to the middle line, but was less definite as to its limit on the chin and lips than above those points. He complained of pain over the right eye, and of red flushes in that organ. A careful thermometric examination made during repose showed no difference in the heat of the two sides within the mouth or ear. This was not repeated when the face was flushed by exertion. The symptoms gradually became less noticeable, and in less than three months had entirely disappeared.

The symptoms the authors attribute to injury of the right cervical sympathetic ; an explanation not likely to be disputed.

The second case is only alluded to in the work quoted, but I quite agree with Dr. Ogle in regarding it, from the slight indications given, as one of injury to the cervical sympathetic. It is that of a captain who suffered from loss of sight immediately upon injury of the right neck. There afterwards occurred slight ptosis, worse on waking in the morning, and contracted pupil, but no unilateral flush. The secretion of sweat on the right neck, arm, and chest was also deficient. On the left side, which was not wounded, the sweat was perhaps excessive in amount. Two years elapsed without change in these symptoms.²

A few of the more interesting points in these cases may now be noticed seriatim.

¹ Op. cit., p. 39.

² Op. cit., pp. 44 and 86.

The fact that there was loss of the hyperæmia, but survival of the other disturbances caused by section of the sympathetic, is quite in accordance with the results of experiment on animals. The hyperæmia disappears after sixteen or eighteen days in rabbits, or after some weeks in dogs, rarely lasting for months. In one dog observed by Schiff the hyperæmia lasted two years, but this was a very exceptional case. The other symptoms are also quite similar to the results obtained by experiments.

Retraction of the eyeball has constantly been observed in animals as a consequence of section of the cervical sympathetic. It occurred also in Dr. Ogle's case. The same is true of the apparent diminution in size of the eyeball and narrowing of the palpebral fissure. In no other case does the curious lividity presented by this child round the eye seem to have been noticed.

Dr. Ogle's explanation of these phenomena in the eye is as follows:

"The real explanation," he says, "seems to be that which was originally put forward by H. Müller, on theoretical and anatomical grounds, but which has recently received its experimental confirmation at the hands of M. Prevost. Müller discovered in the orbital cavity of mammalia a funnel-shaped layer of smooth muscular fibres, provided with elastic tendons (musculus orbitaris), and so arranged as to be capable by their contraction of propelling the eyeball forward in its socket. This smooth muscle receives filaments from the cervical sympathetic. M. Prevost has recently experimented upon this muscle, and found that direct galvanization of it in dogs causes protrusion of the eyeball, as Müller had supposed. He also found that when this muscular layer was completely divided no motion of the eyeball could any longer be produced by galvanizing the sympathetic. The proof, then, is complete, that it is through the agency of this muscle that the protrusion is effected by the sympathetic. The retraction of the eyeball is then produced partly, or in men wholly, by the relaxation of the funnel-shaped muscle, and also much more completely by the striated retractor muscle in such animals as possess the latter.

While fully admitting the sufficiency of this explanation of a phenomenon of simple retraction, I must point out that the

phenomena in my case were not quite so simple. There was a sort of lividity or haggardness round the eye, which reminded me partly of old age and partly of the appearance of persons who, from sleeplessness, melancholia, or dyspepsia, are “dark under the eyes.” This condition I have always imagined to depend upon flaccidity and absence of œdema in the connective tissue of the orbit, at least as much as upon the muscular tone, and in this case, though, of course, proof was impossible, a similar explanation was irresistibly suggested.

Narrowing of the palpebral fissure, which was a symptom in the present case as well as in Dr. Ogle’s, is constantly seen in experimental section of the nerve. It is attributed by him, on the authority of Müller,¹ to the paralysis of certain smooth muscle-fibres found both in the upper and the lower lid, mostly in the lower—a fact which accounts for his observation “that the diminution of width is due rather more to a raising of the upper lid than to a depression of the lower one.” This did not strike me in my patient. I may repeat that I was quite convinced, from attentive examination, that there was no real *ptosis*, that is to say, no paralysis of voluntary muscles.

I must also again call to mind the remarkable flabbiness of the skin altogether on the left side of the face. It resembled the skin of old age or that seen in badly nourished persons, being quite different from the plumpness and crispness of youth and health. (This applies, of course, to the one side as compared with the other, not to this child as compared with well-nourished children.) This condition may very plausibly be assigned either to want of tone, *i. e.* paralysis of the smooth muscle-fibres in the skin, or, on the other hand, to a want of crispness and elasticity in the connective tissue of the skin itself and under the skin. We do not, perhaps, possess sufficiently accurate knowledge to repudiate entirely either of these causes.

The remaining most remarkable symptoms of the left side, *viz.* the deficiency of secretion under ordinary circumstances, as shown in the dulness of the left eye and the dryness of the nostril, and the absence of any increased secretion under excitement, must be for a moment considered.

The same thing was observed by Dr. Ogle, the patient, in his case, declaring that no mucus ever came from the nostril

¹ See also Turner, ‘Nat. Hist. Review,’ Jan., 1862

of the affected side, that this side of the mouth felt drier to him than the other, and that he never sweated on that side of his face. Dr. Ogle also quotes another case from the American surgeons,¹ where there was a marked defect in the secretion of sweat on the side of the supposed sympathetic lesion. I cannot find any distinct observations on the subject in animals.

Looking, however, at the well-known effects on secreting glands of active irritation of the sympathetic, it would seem not unreasonable to set this deficiency of secretion down to the simple abolition of some functional stimulus commonly conveyed through the sympathetic trunk. It cannot be merely due to anæmia, since, if there were sufficient blood for the preservation of the tissues, there would be enough for some functional activity. It is well known that stimulation of the sympathetic produces a peculiar kind of secretion from the salivary glands, and section of the nerve is accompanied by another kind of secretion. The former we may consider as due to a special or nutritive stimulus, normally conveyed through the nerve. The latter (whether normal or excessive in amount) must be attributed to the special stimulus caused by hyperæmia. When, accordingly, the stage of hyperæmia is past, as it was here, the stimulus due to that cause will be wanting; and the special (probably nutritive) stimulus being also absent in cases of total section, it is easy to see that the secretive stimulus of all kinds must be at least deficient, if not altogether wanting. It appears to be a necessary condition of the stage of anæmia consequent on total division of the nerve.

[The direct influence of the sympathetic is a question which has been much debated, but the researches of Von Wittich, confirmed by Nawrocki,² showed an increase in the secretion of the parotid when the sympathetic was stimulated. Heidenhain also observed the same phenomena in the gland, as after stimulation of the chorda tympani.³ Even those observers who obtained divergent results admit that stimulation of the sympathetic accelerates for the time the liberation of the secretion.]

As to the general fact of anæmia subsequent to hyperæmia after sympathetic lesion, I am not prepared to offer any theory,

¹ Mitchell, Moorehouse, and Keen, *op. cit.* pp. 44 and 86.

² 'Virchow's *Jahresbericht*' for 1868, vol. i, pp. 125 and 134.

³ *Ibid.*

though the explanation given by Dr. Ogle of the absence of the usual effects of excitement (which will be presently considered) may serve here also. It is, however, well known, experimentally, that the hyperæmia first produced by section of the sympathetic always diminishes, and sometimes disappears, while the other morbid phenomena remain. The decision of the question accordingly does not rest upon a single case.

There remain, then, for consideration the ordinary phenomena of the right or uninjured side and the phenomena of both sides under conditions of excitement.

The right side of the face in this child was natural in appearance, but there was constant watering of the eye and constant running from the nostril. In Dr. Ogle's case the secretion on the sound side was normal, but not more than normal. In two cases observed by the American surgeons something of the kind was noticed. Of one it is said that the eye of the sound side watered a good deal; of another, that the secretion on the unwounded side was, perhaps, excessive.

This excessive secretion on the unwounded side is by no means easy to explain. Two bases for a hypothesis suggest themselves. In the first place, it might be due to vicarious secretion, the inactivity of the glands on one side being compensated by excessive activity on the other, just as one kidney enlarges when the other is destroyed. It is plain that what might be a normal amount of secretion, when distributed over both sides, would appear excessive if accumulated on one. The phenomenon would then be a direct consequence of the inability to sweat on the affected side, which was observed also in Dr. Ogle's case. A second view which might be entertained is that the cause was nervous, the unwounded sympathetic being in some manner influenced by the condition of the injured one. This explanation is, however, at the best, obscure, and would not account for the fact that, of all the phenomena controlled by the action of the sympathetic, those connected with secretion alone should be altered on the unwounded side.

We now pass to consider the phenomena of the two sides under the influence of excitement, the absence of any change on the affected side, and full or excessive effects produced on the unwounded side. The former of these results can hardly appear surprising if we suppose the nerve to be completely divided,

for then the channel by which excitement of the nerve-centres affects the circulation is clearly non-existent. The blood-supply on this side will then be unaffected by the condition of the vasomotor centre, and will remain stationary, whatever amount of hyperæmia be produced by that cause on the other side. I therefore fail somewhat to see the necessity for the elaborate explanations put forward by Schiff and Ogle. The former (as quoted by Ogle) accounts for the phenomenon by his theory of "active vascular dilatation." But surely, if the dilatation were wholly passive, the absence of change on the wounded side would equally be observed. Dr. Ogle has very ingeniously compared the results on voluntary muscles of nerve section, the muscular tissue first passing into a flabby and relaxed condition, which is succeeded by one of shortening and contraction. So, he supposes, the paralysed smooth muscles of the arteries first cause hyperæmia by their relaxation, but afterwards (still remaining paralysed) suffer contraction and diminish the capacity of the vessels so as cause anæmia. As an explanation of the loss of hyperæmia in such cases nothing can be more complete nor, we may add, better supported by analogy. The corresponding condition of voluntary muscles was clearly observed by Messrs. Mitchell, Morehouse, and Keen, in their classical labours on gunshot wounds of nerves, and may often be traced in infantile paralysis.¹ This change has not, it is true, been actually observed in cases of sympathetic lesion, but something very similar is an extremely common morbid condition in the arteries of persons past middle life. I mean the degenerative changes, ending in calcification, which occur in the middle muscular coat of arteries, often accompanying but quite distinct from atheroma. Of these changes, too, it may be said that they are not improbably connected with excessive vascular turgescence often repeated. This rigidity of the vascular muscular fibres would certainly prevent full dilatation of the vessels under any cir-

¹ We may note in passing that this is one explanation of the paradoxical characters of paralytic club-foot. The shortened muscles, and not their antagonists, are very often (perhaps not always) the more completely paralysed. Their shortening is not due to normal contraction (as often supposed), but to their secondary degeneration or induration in question. This fact, which may, perhaps, serve to reconcile two opposing schools of orthopædic surgeons, is sometimes clearly seen in infantile paralysis.

cumstances, but in this particular case of excitement it is not easy to see what should even tend to cause dilatation.

If there were any other path between the vaso-motor centre and the vascular nerves of the head and neck, we should expect, of course, a different result. Then central excitement ought to influence the circulation, notwithstanding the section of the sympathetic. In rabbits this is, according to Dr. Ogle, the case ; but the residue of normal action is explained by him as probably due to the fact that the "vasal nerves of the rabbit's ear do not all pass by the cervical sympathetic, but are, in part, contained in the great auricular nerves, partly also in a branch derived from the fifth nerve." Is there any corresponding anatomical fact in man?

In the case recorded by the American surgeons there was, under the influence of excitement after exercise, a unilateral flush *on the side of the nerve injury*, a phenomenon precisely opposite to that observed in my case. Unless there is some such anatomical disposition, at least in individual cases, we can only suppose that in the American patient the section was not complete, or else was at that time partly healed. The fact is quite unexplained on the theories of Schiff and Ogle.

Although the foregoing case has been but imperfectly observed and recorded, it may, perhaps, have its value as one of the small collection of instances which make up the pathology of the sympathetic nerve in man. Other cases must from time to time occur, and it is to be hoped they may sometimes be observed under more favorable circumstances.

ON THE USE AND ABUSE OF ATROPINE.

By R. LIEBREICH.

THE great progress made in the treatment of inflammatory affections of the cornea and iris by the local application of atropine has been fully stated in complete accounts of this remedy in modern text-books on ophthalmology.

If, nevertheless, I undertake to write upon a subject so very well known to all ophthalmic surgeons it is done principally under the conviction that the prescriptions of general practitioners are not always given with a full consideration of the necessary modifications of treatment for different cases. I shall, therefore, describe more particularly the method of treating different cases, and occasionally mention those points in which I am compelled to differ from the principles generally accepted in ophthalmic practice.

I have here to relate the accumulated experiences of a special branch to those who, while actively engaged in general practice, have no opportunity of entering into the minute details of every department of such a comprehensive science.

I must, therefore, be excused if I occasionally assume the position of a critic, or if I am, in the description of details, perhaps, too didactic.

I.—*In Iritis.*

In the treatment of iritis it is of the greatest importance to apply the atropine in proper quantity. As soon as a correct diagnosis is made scarcely anybody would hesitate to administer atropine. But too often we find such an indefinite prescription as this given—"Put several drops in the eye"—and that this pre-

scription is invariably continued by the patient for a long time without change. The inflammatory process, indeed, gradually subsides, especially if the other conditions and treatment are carried out with a due regard to the natural progress of the disease. But on close examination of the cured eye we see that more or less numerous and extensive adhesions of the iris remain behind. The greatest care must be taken to avoid such a result. For besides the constitutional tendencies to relapses (such as the syphilitic or rheumatic), the prognosis in these cases of adhesions is still more unfavorable—first, because the adhesions themselves mechanically promote relapses; besides this, they produce optical disturbances, or give rise to complicated affections of the deeper parts; and lastly, in the treatment of subsequent relapses there may be difficulties on account of old adhesions. In the same cases the prognosis would have been much more favorable if the iritis had been cured without leaving adhesions behind.

In simple cases a proper use of atropine would be sufficient even without any other treatment to produce a most favorable result. In more severe cases, even with the most energetic and careful treatment, a perfect result could not be obtained without a proper quantity of atropine.

How is this local application of atropine to be regulated? The strength of the solution is of little importance provided that it be not too weak. The necessary quantity is determined by the number of applications, or rather by the time during which we enable the cornea to absorb the atropine by keeping the conjunctival fluid saturated with the alkaloid.

Suppose that for the sake of simplicity we use in all cases a standard solution of four grains of atropine to the ounce of distilled water, and that each application consists in the instillation of one or two drops, unless the lachrymal secretion be very abundant, and then a little more should be used. Then the principal question to decide will be, how many times daily and at what intervals to repeat this application? It makes, indeed, no difference at all whether we put in several drops or a large quantity of the solution at one time, and it always reckons as one application; on the contrary, two drops administered at an interval of five minutes or longer have a double effect and are reckoned as two applications. Because in this way the conjunctival fluid has atropine mixed with it for a longer time, and,

therefore, a larger quantity of the alkaloid penetrates the cornea to mix with the aqueous humour. As a rule for the number of such applications, we can only say that the pupil should be completely dilated as soon as possible, and that this dilatation must be maintained during the whole progress of the inflammation, and even for several weeks after it has abated. For this purpose, the quantity required for different cases varies so exceedingly that it is quite impossible to fix dogmatically a definite amount. To keep up this dilatation it is in one case sufficient to go on with one application daily, whilst in other cases three, four, or more applications are required, and only after several weeks it becomes possible to descend to one application daily, or the pupil contracts again and new adhesions are formed. Each case must be judged by itself, but, of course, experience in estimating the amount of inflammation assists one to an approximate conclusion.

In the great majority of cases we find no difficulty in carrying out the afore-mentioned plan of treatment. But iritis being such a very frequent disease, even the exceptional cases in which we meet with difficulties in applying atropine are still very numerous.

These difficulties depend upon the following conditions :

1. *Too great intensity of the inflammatory process.*—Under these circumstances atropine will sometimes not be tolerated ; it increases the inflammation and cannot produce the desired effect. Then it is necessary in the first place to give derivatives, and in strong individuals to reduce the intensity of the inflammation by bloodletting, and after that only to apply the atropine. The inflammatory symptoms become seldom so intense spontaneously, but they are sometimes increased to such an extent artificially, by wrong treatment. This happens especially in consequence of the application of cold, and the lotions generally used for conjunctivitis, such as nitrate of silver, sulphate of copper, sulphate of zinc, &c., which artificially increase the iritis.

To mistake iritis for conjunctivitis, which, I am sorry to say, too often happens, gives us an opportunity of observing this fact.

Excluding the afore-mentioned applications generally suffices in such cases to subdue the inflammation, and then the use of atropine becomes again possible.

Cold compresses are always to be avoided in all forms of iritis, and in all stages of the disease without exception. But warm applications are, not only in rheumatic cases, but also in other forms of iritis, very beneficial, and I decidedly prefer the application of dry warmth to warm poultices. I use myself generally warm wadding, and in other cases cotton wool saturated with aromatic oil, which is the same kind of thing as was formerly used—a bag filled with aromatic leaves (simples). To warm it the wadding is to be put in a tin box so that the aroma may not easily escape. To prepare this I use the following recipe:—Ol. Lavand., Ol. Maris., Ol. Thymi, āā ʒj; Ol. Pini Sylvestr., Bals. Peruvian., āā ʒij; Spirit. vini rectif., ʒvj.

2. *Copious exudations in the anterior chamber.*—There are special cases of iritis characterised by a large exudation into the anterior chamber even at the commencement, and without special appearances of extensive inflammation. As the result of this the aqueous humour becomes quite turbid, the tissue of the iris and the pupil hazy, the distinctness of vision is considerably disturbed, and the atropine penetrates with difficulty to the iris.

If there is anything which makes it impossible in such cases considerably to increase the amount of atropine, firm and extensive adhesions of the iris are formed in a comparatively short time, upon which, even after the aqueous humour has been cleared up, the atropine has no power. In such cases it is advisable in the first stage of the disease to perform at once a paracentesis, so as to empty the anterior chamber several times as completely as possible. The newly formed fluid then allows the atropine to enter in the ordinary way, so that it becomes possible to dilate the pupil and to keep it dilated.

3. *Adhesions already completely organized.*—In the majority of cases of iritis which come under our treatment, not quite at the commencement of the inflammation, we find the margin of the pupil here and there already fixed to the capsule. But at the commencement this adhesion is not so firm, and quickly yields to the action of the mydriatic provided that it is used in sufficient quantity. But if already some time has expired the separation cannot be made, especially if there are extensive adhesions, with thick exudations fixing it to the capsule; nevertheless, we must give it a fair trial, the more so as it is very necessary to prevent further progress of the adhesions by the

separation of that portion of the pupillary margin which still remains free from the capsule.

However, I differ from this rule, and from the generally accepted method of treatment of those relapses of iritis in which, after an insufficient use of atropine in earlier attacks, a complete or nearly complete adhesion of the margin of the pupil to the capsule has taken place. In such cases I renounce at once the application of atropine, as I know from a comparison of several cases that the remedy will not only not produce the desired effect, but that it will increase the intensity of the attack by its useless action upon the iris. Warmth, derivatives, and the usual constitutional treatment, will in such cases subdue the inflammation quicker without the use of atropine. If abundant exudation in the anterior chamber, effusion of blood, or hypopion exist, as may happen in cases of relapsing iritis, then, as was before mentioned, paracentesis should be employed. I cannot recommend an iridectomy in the acute stages of inflammation. This operation should be deferred to the intervening periods. And even where the urgency of the symptoms require it we may perform a preliminary paracentesis, because after the termination of the inflammation the conditions for the iridectomy are more favorable.

I may take this opportunity of urging that the experience of modern ophthalmology upon the effects of iridectomy, and especially Graefe's ingenious discoveries, might lead many surgeons to be too ready in the performance of this operation and to extend its indications beyond their proper limit.

4. *Symptoms of atropine poisoning.*—Proceeding from the slightest to the most severe, the symptoms of atropine poisoning are as follows:—Dryness of the mouth and throat, bitter taste, thirst, dysphagia, quick pulse, flushed face, general excitement, hallucinations, and delirium.

The first are frequently produced as the result of the instillation of atropine into the eye, the two last only very seldom.

The poisoning is not caused by absorption through the eye; there is always very little absorbed in this way, but by the considerably greater quantity carried through the lachrymal ducts to the nose, throat, and stomach. There is great difference in the action of this remedy when applied to different individuals; it does not depend at all upon a more or less strong power of

resistance to the atropine, but only upon the greater or less facility with which the conjunctival fluid carries it into the nose and throat, or, in other words, upon the permeability of the lachrymal apparatus.

Here, then, we have at once the means of preventing these symptoms of poisoning. For, usually it is sufficient to let the throat be rinsed out after the application. When more care is requisite, we must direct the patient to sit down with the head bent and the eyelids closed; he must place the forefinger near the lachrymal sac so that the skin of the under lid may be a little drawn down and the lachrymal point everted. Exposed to the air, and not to the moisture of the tears, it ceases to act, and as the greater part of the fluid passes from the conjunctiva to the nose by the inferior and only a little part through the superior canaliculus, it is sufficient to put out of action the inferior one. If the patient is not sufficiently skilled or intelligent to evert the lachrymal point himself, we can effect the same purpose by painting collodion upon the skin of the lid.

For exceptional cases, in which it is necessary with individuals who are easily poisoned, to administer a very strong solution, I have devised a little instrument of the size and form of a serrefine with the point rounded off. We take with it a fold of the skin on which the little pincers fix themselves. By this traction upon the skin the lachrymal point will be everted.

5. *The sensibility of the skin of the eyelid and conjunctiva for atropine.*—Cases of idiosyncrasy such as those described by Mr. Lawson, in which after a single application of atropine inflammation of the conjunctiva or erysipelas has occurred, are seldom met with. But a similar condition very frequently appears after a very long use of atropine in patients who bore the remedy perfectly well at the first even in larger doses.

Sometimes pale, pearl-like, elevated granulations, without injection or augmented secretion of the mucous membrane appear; sometimes a violent conjunctivitis with copious secretion, occasionally complicated with irritation of the margins of the eyelids, an eczematous state of the lids, with inclination to ectropion; sometimes an erythema of the corresponding side of the face, increasing to an erysipelas, follow a prolonged instillation of atropine.

By discontinuing the atropine and by the use of a lotion of nitrate of silver, the conjunctivitis and the irritation of the skin usually subside very quickly, but the granulations resist this treatment for a long time. We very often have the opportunity of observing cases in which patients, believing in the beneficial effect which the atropine has had during the iritis, continue the application of it for a very long time, even when they are no longer under medical treatment.

One of the principal troubles is that in the treatment of an occasional relapse of iritis we meet with difficulties in the application of this most important remedy. To overcome this it is necessary to apply with caution a weak solution of nitrate of silver to the eyelid in the form of compresses or to apply a stronger solution to the skin with a camel's-hair brush, provided that we take special care not to increase the irritation of the eye by cauterizing the mucous membrane.

The varying rapidity with which such symptoms appear depends in part upon the individual dispositions, but in part also upon external circumstances. There are, for instance, preparations of atropine of different qualities, having different irritating properties, as we may prove, seeing that the same patient can tolerate one solution while another solution will be very painful. In dispensaries and eye departments often a contagious affection of the mucous membrane will spread easily from one to another, if, as never ought to be allowed, the solution is applied with a camel's hair brush, that when dipped again into the bottle some of the secretion of the mucous membrane is introduced. The neutral solution does not destroy the infecting power of the secretion. Therefore, it is more important to put the atropine solution in with a drop glass, than the nitrate of silver and other strong reagents. In hospitals where the patients take their medicine away with them, the atropine being very expensive, we can also economise by using a drop glass. In St. Thomas's eye department I have introduced a little drop glass, which costs only threepence, and it is given to the patients.

II.—*In Keratitis.*

The important indications in the treatment of iritis, viz. to

put out of action the sphincter of the pupil, and to remove the margin of the pupil away from the capsule, does not exist in the treatment of keratitis; but there still remains a very important property of atropine for the treatment of these diseases, viz. to diminish the sensibility of the cornea, to relieve intra-ocular pressure, and to promote a so-called antiphlogistic effect by its influence upon the distension of the deeper vessels.

Therefore, atropine is to be applied immediately in all fresh cases of keratitis. But the dose is much smaller; one or two drops daily are sufficient. Excepting, first, those cases in which so copious a discharge of tears takes place that the solution will be very soon washed away. Secondly, all forms of keratitis in which the permeability of the cornea is diminished. Thirdly those cases of keratitis which are characterised by an intense injection of the deeper vessels and by the tendency to be complicated with iritis. In these varieties it is sometimes necessary considerably to increase the dose of atropine for a short time, but it is advisable to diminish it so soon as the pupil is fully dilated.

In the common forms of superficial keratitis, such as pannus, phlyctenulæ, little infiltrations, small superficial ulcerations, I stop the application of atropine at once as soon as a single application produces an effect for twenty-four hours. I then proceed in all the above-described forms of disease (but on no account in parenchymatous keratitis) immediately to apply nitrate of silver. This is in opposition to the usual mode of treatment, but I always found it followed by a most favorable result.

The rule, viz. to administer the atropine so as to dilate the pupil, and so soon as it remains dilated by a small dose for twenty-four hours to commence the solution of nitrate of silver, appears very empirical; but it is founded on this, that even the rapidity, the facility, and the duration of the effects of the atropine give a correct indication of the intensity of the deeper irritation. In the latter nitrate of silver will not be tolerated, but it acts very favorably as soon as the deep irritation has subsided.

Only in parenchymatous keratitis do I continue the use of the mydriatic for some time after the cessation of the deep irritation.

III.—*In Operations.*

1. *Extraction of Cataract.*—The dilatation of the pupil before the operation is not absolutely necessary, but desirable. Immediately after the escape of the fluid of the anterior chamber the pupil contracts; but we do not thereby lose the benefit obtained by the before-procured dilatation, because without atropine the contraction would be much stronger. Another advantage consists in knowing the degree of dilatation of the pupil that can be obtained in every case, for, especially in old people, with otherwise normal eyes, this varies considerably. *After* the operation the effect of atropine is partly prophylactic and partly therapeutic. With regard to the latter, we must refer to the instructions given for the treatment of iritis. With regard to the prophylaxis, we must proceed in a very different manner, according to the individual cases and according to the method of the operation. For my method of extraction I have made many comparative experiments, and have at last found it most desirable to put the atropine in on the second day, usually a single drop, and not to repeat it so long as the pupil remains dilated. Only in the rare cases in which it is impossible to remove completely the remains of the cortex do I put in a drop of atropine immediately after the operation, and again after the first twenty-four hours. But if unexpected irritation should arise I apply the atropine at once, energetically.

This and the dry bandage constitute, almost without exception, the whole of my after-treatment.

2. *Discission.*—Whether we perform this operation in cases of secondary cataract, partially absorbed or completely softened cataracts, it is always necessary, before the operation, to dilate the pupil, and energetically to keep it well dilated by a prophylactic application of atropine. Difficulties in the application of it, such as we have already mentioned when describing the treatment of iritis, must be well considered beforehand, because they may give, under certain circumstances, a contra-indication for discission, and compel us to extract.

If after the discission a considerable swelling of the lens takes place, so that the resulting irritation of the iris cannot be overcome by the strongest possible dose of atropine, this gives an

urgent indication for immediate extraction of the lens, after which the atropine will regain its lost power.

3. *Iridectomy.*—In an operation so variable it is not possible to establish a general rule for the use of atropine. We must, therefore, indicate a few of the leading points with reference to it. In the operation itself there is neither an indication to apply the atropine beforehand nor after the operation for prophylactic or therapeutic purposes. In an artificial pupil made only for optical reasons it is unnecessary; for glaucoma, where the therapeutic effects of the iridectomy is intended, atropine seems to me decidedly injurious.

I should object, also, for the reasons mentioned under iritis, its application in cases of iridectomy with total and completely fixed adhesions of the pupillary margin to the capsule, or to the corneal cicatrix. But an energetic application of the mydriatic in other cases, immediately after the iridectomy, may be of great use; thus, for example, in adhesions which are limited to one side of the pupil, but cannot be entirely included in the operation of iridectomy, so that on one or both sides of the artificial pupil small adhesions remain. Sometimes we succeed in removing them after the iridectomy by the use of atropine. Sometimes, also, the atropine produces an effect after the iridectomy, which could not be done before the operation, in such cases as hypopion keratitis with consecutive iritis. In these cases the effects will be facilitated by removing the exudation from the anterior chamber, and also by excising a portion of the adhesions, and, lastly, by diminishing the inflammatory state of the deeper parts following the operation.

IV.—*In Injuries.*

According to the nature of the injuries, atropine has to fulfil one or more of the indications mentioned in the departments of iritis, keratitis, and operations. So it is exceedingly valuable in superficial abrasions of the cornea and for the removal of foreign bodies, by its anæsthetic effect upon the cornea. In perforated wounds with prolapse of the iris it has also a mechanical effect by promoting retraction of the iris and an antiphlogistic effect by preventing or curing the iritis. It is only in extreme peripheral prolapse of the iris that the extract of the Calabar bean is occasionally to be preferred. In those cases, namely,

in which it is by mechanical reasons easier to draw away the iris out of the prolapse by contraction than by dilatation. If the capsule is also wounded the atropine has the same action as in discission. Also with regard to the strength of the solution, the frequency of its application, the necessary precautions and the difficulties, we should have to repeat the same directions for the different injuries as we have already given under the head of iritis, keratitis, and operations.

V.—*As an aid to Diagnosis.*

1. For ophthalmoscopic examinations.

I have already taken the opportunity of expressing my regret, in a lecture published in the 'Medical Times and Gazette,' Oct. 28th, 1871, p. 519, that frequently patients who are sent to us by their medical advisers for ophthalmoscopic examination have their pupils dilated beforehand with a strong solution of atropine, supposing that such a dilatation is always necessary for the examination with the ophthalmoscope. It is done with a view to save the patient as well as the ophthalmic surgeon the time required for the dilatation. But this always causes some inconvenience because it prevents us from making a complete examination of the eye.

Before we use the ophthalmoscope we have to examine the aspect of the surface of the eye, the mobility of the pupil, the refraction and accommodation, the acuteness of the central vision, and the field of vision. We are prevented from doing this if the natural condition of the eye is changed by the preliminary application of atropine. Therefore dilatation ought to be effected only after the termination of these researches, and then only if it is really necessary. Where the pupil is exceptionally small (myosis), or in adhesions of the iris, or opacities in the dioptric media, it may be required; but in the majority of ophthalmoscopic cases we can do without the dilatation. Of course the examiner must have the necessary experience, and the proper instruments. If, for instance, the central hole in the ophthalmoscope is somewhat too large, then it is impossible to examine the erect image without dilatation, because the shadow passing from this hole in the mirror as the base of a cone fills up, so to speak, the whole of the pupil, and

so the light reflected from the mirror cannot enter it ('*Medical Times and Gazette*,' Nov. 18th, 1871, p. 611).

In order to be able to examine the direct image without artificial dilatation of the pupil, it is necessary to use a mirror with a sufficiently small and carefully worked hole in the centre. If the hole is nearly as large as the pupil of the patient, it is impossible to throw light enough into his eye. If the margin is irregular, containing little scratches, or if it forms a channel instead of a sharp ring, the reflex of light proceeding from this border puzzles the observer by producing entoptic phenomena in his own eye.

A very small part of the mirror only throws light into the pupil—namely, that which immediately surrounds the hole. It is therefore quite useless to use very large mirrors, which are tiresome to the patient, without giving a stronger light to the part of the fundus under observation.

Since I gave these explanations, the diminution of the mirror and its central hole has often been made too great. If the mirror is too small, it cannot well be put against the supra-orbital margin, and insufficiently protects the observer against the flame. Too small a hole has two great inconveniences—first it diminishes the intensity of the light, allowing only too small a pencil of light to pass from the observed to the observer; secondly, it acts as a stenopaic apparatus, and deprives us of our judgment on the refraction of the patient by suppressing the circles of dispersion.

I therefore propose to make the hole not smaller than two millimètres, and the mirror not smaller than three centimètres, and to use in preference a thin silvered glass mirror, the centre of which is not perforated, but only deprived of the silver covering. The focus of the mirror may be eight or ten inches.

If in spite of a proper shape of mirror the examination is impossible without dilatation; if in affection of only one eye, or in a very high degree of amblyopia of both eyes, the dilatation is of no special inconvenience to the patient, then only a very weak solution of atropine should be used. One drop of the ordinary solution (four grs. to $\mathfrak{z}\text{i}$), if we have only this at hand, in a drachm of water, and one drop of this applied, will be perfectly sufficient. The advantage of the weaker solution is the

shorter duration of its action, and, consequently, the speedier cessation of the disturbances arising from the dazzling and want of accommodation. This point must be especially considered in poor patients living by their own handiwork.

2. To determine the refraction in asthenopia and strabismus convergens.

Whilst, as we have said, in examining for accommodation and refraction atropine is to be avoided, single cases occur in which the real state of refraction is veiled by a spasmodic action of accommodation, and becomes evident after the accommodation has been paralysed by the action of atropine. The refraction, that is to say, the optical state of the eye during its adaptation to the farthest point, appears in such cases stronger than it is; so, for instance, a shortsighted eye appears *more* shortsighted than it really is, a normal sighted eye appears shortsighted, a hypermetropic eye *less* hypermetropic, emmetropic, or, in exceptional cases, even myopic, as described by me in the 'Archiv für Ophthalmologie,' viii, 1, 1861; and so what we make out as the farthest point is not really the farthest point, but only the most distant up to which the too strong action of accommodation may be reduced. The best means of making out at once the real state of refraction of these eyes is to apply atropine. But it is not sufficient as for ophthalmoscopic examination to put in one drop of a weak solution, the standard solution must be applied several times, till the examination of the extent of the accommodation shows a complete disappearance of the latter. Then only are we sure to determine the real amount of refraction by stating the degree of it, when for the time being it has been rendered unalterable by the mydriatic. But we must not proceed in this way before having ascertained that the patient is able to give up work for eight to fourteen days, and unless he is willing to submit to the unpleasant dazzling sensations associated with dilatation of the pupil, often doubly irksome to those patients already nervously irritated by the inconvenience of the asthenopia. If the patient objects we must adopt a more protracted treatment, *i. e.* the use of systematically changed spectacles; that is to say, to adjust prisms, or, according to the nature of the case, prismatic or decentric, convex or concave glasses, which are at first made out approximately and increased, according to their after effect, so long

as the state of tension of the accommodation is diminished by their influence, till the refraction comes to its normal state.

By a physiological connection between the degree of convergence of both optical axes and the accommodation of each eye, the weakness of the internal recti requiring a higher degree of innervation produces at the same time a certain degree of spasm of the accommodation.

On the other hand, a too weak refraction (hypermetropia) causes in the same way, by means of an effort of accommodation made to correct it, a too strong contraction of the recti interni muscles; that is to say, convergent strabismus, which, at the first, only appears periodically or during the effort of accommodation, and which, at last, becomes permanent by changes in the substance of the muscle. But even then there exist for a long time, in many cases for ever, a considerable difference between the degree of the permanent deviation and the higher degree of it which exists during the efforts of accommodation.

In the treatment and operation for strabismus it is of importance to distinguish between these two states. The one depending upon optical defects (hypermetropia) can be cured by an optical remedy (convex glasses). The permanent strabismus depending upon mechanical or muscle changes can only be remedied mechanically by an operation.

The effort of accommodation makes it sometimes difficult to draw a distinct line of demarcation between these two conditions. Now, atropine helps us again in overcoming this difficulty, because, after completely relaxing the accommodation, it takes also away the increase of convergence, and leaves only the constant deviation depending upon mechanical conditions.

But in this case, as with asthenopia, one can, although by a slower process, come to a definite conclusion by using gradually increased convex glasses.

Although these cases are very frequent I still very seldom require to use atropine for the asthenopia, as well as for the periodic strabismus, because I have had sufficient opportunity of observing how extremely unpleasant the condition is for the patients, in which it is necessary to place them for several weeks, and how great is the discontent of those who are unexpectedly placed in this condition. There is a great difference

if, by using atropine, we take away the accommodation from persons who, in consequence of an inflammation, such as keratitis or iritis, are incapacitated for work; or if we have to do with persons who are still able to work, although with difficulty, and are generally able to see clearly and without impediment for all ordinary circumstances.

3. The determination of the acuteness of vision in opacities of the dioptric media.

In opacities almost or entirely covering the pupil it is necessary to know what is the difference in the acuteness of sight with a narrow and a dilated pupil—on the one hand, to state if the opacities alone account for the diminution of the acuteness of sight, or if a complication with other diseases (amblyopia) must be suspected; on the other hand, to determine whether, or up to what amount, a permanent artificial expansion of the area of the pupil, by means of iridectomy, may improve the sight, and at what part it could be performed with the greatest advantage. Cases of leucoma and zonular cataract give most frequent cause for such consideration. In cases of hard cataract gradually forming, in which the opacity of the nucleus has disturbed the vision for many years before the extraction can be performed, we sometimes happen to obtain considerable improvement of sight by dilating the pupil. If we wish in these cases to avoid an iridectomy we can prescribe a weak solution of atropine, and order one drop of this to be put in about once a week; by this means we may help the patient during a part of the time he has to wait till the operation. But we must not forget to remind him that if the slightest irritation of the conjunctiva should supervene the application must be immediately suspended.

ON THE
EXISTENCE OF CONTINUED CURRENTS
IN FLUIDS,
ILLUSTRATED BY FURTHER EXPERIMENTS.

By GEORGE RAINEY, M.R.C.S.,
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THE object of this paper is to show the effect of alterations in temperature upon the currents which I have previously described as existing in fluids in a so-called state of rest.

For purposes of convenience I have examined fluids contained in glass tubes terminating in a bulb, and I have so employed heat and cold (both as produced artificially and as occurring naturally) as to show the influence they exert when applied to a particular part of the apparatus or generally.

The apparatus required for the experiments I am about to describe consists merely of a portion of glass tube, about one third of an inch in diameter and two inches in length, one end of which is to be blown into a bulb about one inch in diameter, the other end being open. After the introduction of a suitable mixture this end has to be hermetically closed.

For a first experiment the apparatus above described, filled with a mixture of a saturated solution of calcic nitrate and very fine particles of Indian ink (prepared in the manner described in the first volume of the 'Reports,' at page 91), was completely

immersed in water cooled down by ice, in which it was detained sufficiently long to secure an equal reduction of temperature of the whole mass. Then this apparatus was removed and perfectly dried, so that no water might be left upon it to cause, by evaporation, any reduction whatever of the temperature of the contained fluid during the time the apparatus was exposed for examination to the air, which was then at the ordinary temperature. The fluid in the tubular part, placed horizontally, was examined with a one-inch lens, and its currents, as indicated by the movements of the floating particles, were seen to be normal; that is, the upper current was from the tube to the bulb, and the lower one in the opposite direction.

At first, however, these were more rapid than ordinary; but as the fluid in the apparatus became of the temperature of the external air the currents became of the usual speed, and so continued. The fact of the increased speed of the floating particles in the tubular part of the apparatus was in this case due to the temperature of the fluid in the bulb remaining lower than that of the fluid in the tube, in consequence of the process of the heating of the fluid in the stem being more rapid than that of the fluid contained in the bulb. But after the apparatus had remained sufficiently long under these conditions, and the whole of the fluid within it had become of an equal temperature, the speed of the currents became normal, and continued normal as long as the fluid in all parts of the apparatus was of the same temperature, and consequently of the same density. In the next experiment the same apparatus was (before examination by the microscope) immersed in water of about 90° Fahr., and there retained sufficiently long to raise the temperature of the whole of the contained fluid to that degree. The temperature cannot exceed 90° without danger of breaking the bulb. In this case, as in the former, the apparatus is to be perfectly dried before being submitted to examination, when (as might be expected) the currents in the fluid of the stem will be found to be abnormal, and so they will continue until the whole of the fluid is cooled down to the temperature of the atmosphere. The explanation of the cause of the changes taking place in this experiment is so obvious from what was stated in the preceding experiment that no further comment is necessary.

The next experiments were the same in principle as those before detailed, the only difference being that in these the changes of temperature were those which occurred naturally. In this case all that was necessary to be done was to fix the apparatus on the stage of the microscope, so that all parts of it could be examined in succession without removing it from thence. The time for examination is either when the mercury in the thermometer has just begun to fall, or when it is beginning to rise. The former of these I found most convenient.

In the following experiment the time that the mercury was beginning to fall was chosen for examination of the fluid in the tube of the apparatus. In this case the result was the same as when this apparatus had, after being kept in warm water for a short time, been suddenly exposed to a cool atmosphere, that is, the currents were abnormal. The change from normal to abnormal was first observed at the end of the tube furthest from the bulb, and was indicated by the floating particles beginning to pass somewhat transversely with a speed rather increased. Next, the floating particles of the upper current appeared after gradually descending to join the lower current, and thus no decided arrest of the floating particles could be perceived.

These experiments were performed in September last, when the length of the days was such that their results did not require for their examination artificial light, and thus these changes could not be looked upon as merely accidental.

The experiments and examinations which so far had been confined to the fluid in the tube were next made, under similar conditions, on the fluid in the bulb. On the fluid of this part the change of atmospheric temperature did not appear to have any effect. But in all cases the currents in the fluid in the bulb were much quicker than those in the fluid occupying the tube. The cause of the difference appears to me to be sufficiently obvious, namely, that in the case of the fluid in the stem the shape of the fluid mass is such that one part would admit of being heated or cooled, as the circumstances of the experiment may require, more than another, and thus under the first supposition the conditions necessary for fluid currents would be set up and the upper current would pass from the warmer to the cooler part of the stem or tube, and the lower one in the opposite direction, as is shown

in the first experiment. Now the fluid in the bulb being forced into a spherical form, and, consequently, being equally heated by the surrounding atmosphere, would not be affected similarly to the fluid in the tube, and hence if currents exist in the fluid of the bulb they must be produced in some other way. Now, it is a fact that they do exist in this fluid, and that in this form they are much more rapid than in any other, provided the density of the fluids is the same. I have carefully examined the fluid in the bulb of the apparatus above described, and also in bulbs connected with much smaller tubes, these being immersed in a large quantity of water, and in all I have found currents.

Now, according to the explanation of the manner in which fluid particles are arranged by their own mutual attractions, and the manner in which these particles are kept in motion by that form of attraction called remote attraction, this attraction being variable, and the explanation of the facts of these being the results of the combined action of these two forces will, I think, be manifest.

In the first volume of the 'St. Thomas's Hospital Reports' I explained the presence of constant currents in fluids apparently at rest, and protected from the disturbing influences of evaporation, and change of temperature and the like, by attributing them to the constant antagonism of two forces, the one that of cohesion acting at insensible distances, the other that of gravity. I fear, however, that I did not explain my views quite clearly on that occasion. I will now endeavour to give them more clearly. The attraction of cohesion tends to give to all masses of fluid a perfectly spherical figure; the attraction of gravitation acting on all masses of fluid whose centres do not coincide with the centre of gravity tends to cause in them more or less deviation from that form; and in the modified forms which such masses would finally assume under these antagonistic influences, the fluid particles would be brought to rest in a condition of tension or constrained stasis. Supposing, then, that any such fluid mass has once assumed the particular form due to the co-operation of those two antagonistic forces, it is clear that all movement will cease, not only in the mass as a whole, but in its constituent particles; and that this state of entire rest must necessarily continue so long as the relation between these two forces remains unaltered,

or so long as no disturbing influence of any other kind intervenes. In my present paper I have demonstrated the effects upon such masses of fluid of one of these disturbing influences, namely changing temperature with the modifications of density which necessarily attend it. In my former paper, on the other hand, I showed that even when every precaution had been taken to prevent the intrusion of such extraneous influences, and the masses of fluid were left under the opposing influences of gravity and of cohesion alone, and were apparently at rest, there were still constant currents going on in them. To what, then, were these currents due? Having eliminated from my experiments the effects of all other known influences but those of gravity and cohesion, and having shown that so long as these act uniformly they can effect no change in the form or internal relation of masses of fluid which they have already brought to a state of equilibrium, I had to consider how far these two forces were to be regarded as absolutely uniform in their action. A careful consideration of the matter satisfied me that of the two forces that of cohesion was altogether uniform, but that that of gravity was constantly changing at any one spot on the earth's surface. For it is obvious that the movement of the tides produces a constant change within narrow limits in the direction in which gravity operates, and it seems pretty certain also that diurnal and seasonal changes of temperature which cause modification in the density of the earth's crust must co-operate in some degree in causing such variability. The disturbance here adverted to is, no doubt, small, but it is always going on, and is fully sufficient, I believe, to account for the presence and constancy of the currents under consideration. For a more detailed account of the manner in which the particles of a mass of fluid, brought at any one instant into equilibrium by the balancing, so to speak, of the opposite influences of cohesion and gravity, and how this equilibrium becomes disturbed from moment to moment by such an amount of deviation of the direction of gravity, and thus leads to the formation of currents, I must refer the reader to my original paper.

NOTE.—In the description of the first experiment it will be seen that the currents are increased in rapidity, but their direction remains normal. The cause of this increased motion is an

exaggeration of the conditions upon which the normality of their direction depends.

In the second and third experiments their direction is reversed, but this alteration in direction is readily explainable. For the fluid in the tube is cooled down more than that in the bulb, and rendered more dense; therefore, the lighter fluid passes from the bulb along the upper stratum of the tube, in obedience to the laws which I have insisted on as governing the direction of the currents in the simpler experiments.

CASES ILLUSTRATING
THE RELATIVE EFFECTS OF
PRESSURE ON THE TRACHEA
AND
PRESSURE ON THE RECURRENT
LARYNGEAL NERVE,
IN PRODUCING
IMPAIRMENT OF VOICE AND DYSPNŒA.

By JOHN S. BRISTOWE, M.D.

It is well known that the laryngeal voice as emitted from the mouth often furnishes an important aid in the recognition of certain forms of intra-thoracic disease. The music of the voice is dependent upon the integrity of the vocal cords and the accuracy of their adjustment. To effect perfect phonation the vocal cords must be equally tense, and in accurate apposition in their whole length. The larynx is a reed instrument, in which the pitch is determined by the tension of the cords, and in which the uttered notes are due indirectly to the vibrations of these cords, but directly to the successive puffs of air which escape through the rima synchronously with these vibrations. Among the many circumstances which impair the musical character of the voice, one of the most important (and by far the most important as indicative of intra-thoracic disease) is paralysis of one or other vocal cord, due to compression or destruction of the corresponding recurrent laryngeal nerve. When

such paralysis is present the tension of the two cords is unequal, the chink of the glottis is never perfectly closed, and consequently, when laryngeal intonation is attempted, the air escapes in puffs, which are both unperiodic and unequal in amplitude, and the voice is consequently unmusical—hoarse, whispering, uncertain; and under laryngoscopic examination, while the healthy cord may be seen to execute all its normal movements, that which is diseased will be seen to be flaccid and almost motionless, nearly in the position of closure.

Unilateral laryngeal palsy is a by no means unfrequent indication of the presence of aneurismal tumours, either of the aortic arch or of the innominate and right subclavian; and I believe it is generally held that, under such circumstances, the patient is also liable to those paroxysmal attacks of intense dyspnœa (associated with cough) which are also so common in cases of intra-thoracic aneurism, and which are alike terrible to witness and full of danger.

There is no doubt, indeed, that impairment of laryngeal voice from paralysis of one of the vocal cords and paroxysmal attacks of difficulty of breathing are, both of them, often symptomatic of intra-thoracic aneurism; but are they both the consequence of the same lesion, namely, involvement of the recurrent laryngeal nerve?

It is, of course, a fact that, in many aneurismal cases, all these conditions are combined; the patient has an aneurism, the recurrent laryngeal is compressed, there is loss of voice, and there are sudden attacks of terrible dyspnœa; but, on the other hand, we meet with cases of laryngeal palsy in which there is no dyspnœa, and with cases of intra-thoracic tumour in which there is no such palsy, but in which, nevertheless, paroxysmal dyspnœa forms a marked feature.

About a couple of years ago I had under my care, within a very short time of one another, two middle-aged men, who were suffering from carcinoma, and had also unilateral laryngeal paralysis. The cases are very interesting, but I will here detail only so much of them as bears on the subject now under discussion (see '*Pathol. Trans.*,' vol. xxii, p. 134 and 137). In the first case, the patient was suffering from carcinoma of the œsophagus, commencing a little below the situation of the thyroid body, and extending for some distance downwards; he had also

a few enlarged and hard glands in the lower part of his neck. In addition to the usual symptoms of œsophageal stricture he suffered from hoarseness of voice, which had only come on recently, and was unattended with soreness of throat or cough.

On laryngoscopic examination the cords were seen to be structurally healthy, but the right one moved freely, while the left was motionless in the position of closure. The patient remained under treatment for very nearly three months, and then died suddenly from hæmorrhage due to perforation of the left common carotid. At the post-mortem examination the left recurrent laryngeal was found to be entirely destroyed in a good inch of its course by the advance of the carcinomatous disease. This patient had no difficulty of breathing from first to last.

In the second case, the patient had carcinoma of the retro-peritoneal glands, stomach, and liver, to which the symptoms, in the earlier part of his illness, were mainly due; subsequently his lungs became affected, and the immediate cause of his death was, doubtless, intercurrent pneumonia.

On admission into the hospital his voice was a hoarse whisper, and it had been so for six weeks; but he had not had, nor had he now, either cough, dyspnœa, or difficulty of breathing. The right vocal cord acted well, the left was motionless in the position of closure. The paralysis of the left vocal cord and the feebleness and hoarseness of voice were persistent until his death, which occurred three months after admission; and although during the last three or four weeks of his life symptoms of pulmonary disease, with cough and expectoration, became developed, he never suffered from dyspnœa, far less from severe paroxysmal attacks. During the last two months he had a manifest difficulty in swallowing fluids; they had a tendency to pass into the windpipe. At the post-mortem examination the lungs, trachea, and œsophagus were found healthy, but the left recurrent laryngeal was involved, and lost, in a carcinomatous tumour about the size of a filbert.

Now, in both of these cases there was clear proof, post-mortem, that the patients were the subjects of complete destruction of the left recurrent laryngeal, and it is certain that, during life, they had suffered from those symptoms which, *à priori*, I think, we should have been inclined to attribute to that lesion, viz. impair-

ment of laryngeal intonation, and (in one of them, at all events) difficulty in preventing the entrance of fluids into the trachea; but there was not a trace of dyspnœa, either persistent or paroxysmal.

As cases illustrating the effects of compression of the trachea alone, I will quote the following, of which the first was published by me in the '*Medical Times and Gazette*' of the 20th July of the current year.

A middle-aged woman was admitted into the hospital with feverish symptoms, the cause of which was not very apparent. After lying there for two or three days, with no special change in her condition, she was attacked quite suddenly with intense difficulty of breathing, followed in a minute or two by blackness of face and insensibility. The patient was my own, and I (happening to be at the moment in an adjoining ward) was at once sent for, as also was the resident assistant-surgeon. We met at the bedside; it was obvious that the patient was dying, and that there was a moderate-sized, somewhat unsymmetrical tumour occupying the middle line of the neck immediately above the sternum. There seemed little doubt that this, by the pressure it was exerting, was the cause of her alarming condition, and fortunately, on fingering it, we were able at once to recognise that a portion at all events of its bulk was cystic. A fine trocar and cannula were passed into the most prominent point of the tumour, and between two and three ounces of viscid, reddish-brown fluid were removed. As the fluid escaped, the patient began to breathe without stridor, and normally, her livid tint faded away, her pulse became slower, her eyes opened, and within a minute or two she appeared to be perfectly restored to life and health.

I need not say more of the progress of this case than that, during her subsequent stay in the hospital, the cyst which had been punctured seemed to become inflamed and finally obliterated, and that she left the hospital with a tumour still in the neck, but otherwise apparently well.

There is no doubt that the patient was suffering from what is known as sub-sternal bronchocele; bronchocele, that is to say, with extension of the tumour, behind the sternum, and between that bone and the trachea, a form of the disease which is always extremely dangerous from its liability to compress the

trachea from before backwards, and thus to cause paroxysmal and ultimately fatal dyspnœa. There are no reasons here, nor is there generally reason in such cases to suspect any implication of the recurrent laryngeal. Virchow in his great work on tumours quotes from Hanuschke a very typical and touching case of this kind: "A pregnant woman (who had had several severe attacks of suffocation) sent for him in the full belief that she should die if another attack came on. He found her making her will, yet she did not seem to him seriously threatened, and he was much astonished at the urgency with which she implored him to save her babe after her death. Suddenly an attack of asphyxia seized her; all help was vain, and the doctor had only the consolation of saving the babe by the Cæsarean operation. At the autopsy of the mother a substernal goître was found."

The next case which I shall venture to quote is that of a patient of mine, a man thirty-seven years of age, who died recently in the hospital from aortic aneurism. The local indications of an aneurism springing from the aorta about the point at which the innominate is given off were quite obvious. His chief sufferings for some little time before he came into the hospital, and during the whole time he was under treatment, were due to difficulty of breathing liable to sudden terrible exacerbations. His respirations and his cough were from beginning to end markedly stridulous. But there was never any indication of affection of the vocal cords; there was never any tendency for food to pass the wrong way; and, short-breathed though he was, his voice maintained from first to last its normal intonation. His death was mainly due to pulmonary congestion, with lobular pneumonia, consequent in great measure on long-continued laryngeal obstruction. At the post-mortem examination the recurrent laryngeals were found unaffected; but the trachea opposite the site of the tumour was greatly compressed and narrowed, and already ulceration preparatory to the opening of the aneurism into the trachea was considerably advanced.

The cases which have just been narrated show very clearly in the first place that destruction of the functional activity of one recurrent laryngeal nerve is marked by paralysis of the corresponding vocal cord, which can be recognised by means of the laryngoscope, by impairment of the musical quality of the

voice, and (probably) by some difficulty of swallowing owing to the tendency of food to slip into the larynx, but is not necessarily attended with stridor or dyspnœa; and in the second place, that compression of the trachea involves stridor and difficulty of breathing, which is often paroxysmal and liable to end in sudden death, but that it does not of itself interfere with perfect intonation, excepting only in so far as it may render the voice weak by diminishing the supply of wind to the vocal organ.

The exacerbations of dyspnœa, occurring in narrowing of the trachea, may, perhaps, be due in some degree to spasm of the muscular fibres of the affected part, but are mainly due, I suspect, to actual accumulation of mucus in or below that situation, and to the difficulty of dislodging that mucus in consequence of the mechanical impediment existing there to the performance of an effective cough.

The above discussion leads up to a question of some practical importance, namely, as to how far it is advisable, or not advisable, to perform tracheotomy for the relief of patients suffering from difficulty of breathing dependent on the pressure of an intra-thoracic tumour. Dr. Gairdner some years ago advocated the performance of this operation for the temporary relief of patients suffering in this way from the effects of thoracic aneurism; and I believe his opinion has been largely adopted and acted upon. Now, on the assumption that the difficulty of breathing depends in these cases on pressure on the recurrent laryngeal, and is, therefore, at the laryngeal orifice, tracheotomy is not only a justifiable measure, but one that it becomes our duty to the patient to urge upon him. But if, on the other hand, it be clear that the impediment is not there, but in the trachea, at a point below the lowest possible point of operation, the question assumes a very different aspect. In such a case my own vote would now certainly be given against its performance. It will, of course, be clearly understood that my remarks have reference only to the classes of cases which form the basis of my paper. I am not objecting to the performance of tracheotomy, even in aneurism, if the impediment to respiration be laryngeal; but I contend that the fact of there being unilateral laryngeal paralysis is of no value whatever as an indication either for performing or for withholding the operation. Indeed, I might almost venture to say that its easy recognition

would imply an otherwise pretty healthy condition of the larynx, and, therefore, that if any impediment coexisted with it, that impediment must be lower down. I am not objecting to the operation in cases of diphtheria, or impaction of foreign bodies in the trachea or bronchi. Nor even, may I add, am I objecting to the opening of the trachea in urgent cases of uncertain diagnosis. I would rather be instrumental in having a useless operation performed than find after death that a reasonable opportunity for relief or cure had been missed.

It may be urged against the opinion I have expressed with regard to tracheotomy for the relief of dyspnœa arising from the presence of intra-thoracic tumours—1st, that it might be possible to pass a long cannula through the slit made in the trachea down to and beyond the seat of obstruction, and so relieve; 2nd, that as a matter of fact tracheotomy has been performed with marked benefit in many cases of aneurismal dyspnœa. As to the first point I quite admit the possible benefit to be derived from such a procedure, and should by no means object to it in the case of bronchocele not admitting of tracheotomy below the tumour. As respects the second point, I may state that I have now seen a good many cases in which tracheotomy has been performed, but I cannot venture to say that I have seen any case in which benefit worth obtaining has been obtained. Two or three patients have seemed to be relieved for a short time, but nevertheless have died within a few hours.

I may quote, in conclusion, as a commentary on the last remark, a painfully interesting example of temporary apparent benefit resulting from an unnecessary and fatal tracheotomy operation. A woman, between 30 and 40, was suffering from hysterical aphonia and dyspnœa; tracheotomy was performed for the relief of the symptoms, but within half an hour severe dyspnœa of a different character had supervened; and on examination of her chest an hour or two afterwards the right pleura was found full of air and the lung compressed. The trocar and cannula had been passed into the trachea, but through it and out of it again, on the other side, and thence into the apex of the right pleura, in which position the cannula had been left. Thus all the air inspired through the instrument had simply gone to distend the pleural cavity. She died in a couple of days; but immediately after the operation, and for some quarter

of an hour subsequently, she declared she felt relieved, and seemed better.

Three of the cases, which are given in brief in the foregoing paper, have been published at length elsewhere, and it has hence not been thought necessary to reproduce them here in full detail. The three following cases have not hitherto been printed. The first of them is an example of what is not uncommon, viz. the coexistence, in thoracic aneurism, of pressure on the trachea and involvement of the recurrent laryngeal; the second is one of the cases expressly referred to in the body of the paper as proving that simple pressure on the trachea may cause paroxysmal dyspnœa; the third is a case which does not strictly come within the scope of this paper, but is incidentally referred to at the end of it.

CASE 1.—*Aneurism of transverse arch; pressure on trachea, œsophagus and recurrent laryngeal of left side; paroxysmal dyspnœa; hoarseness; tracheotomy; death.*

J. P.—, a married woman, æt. 31, was admitted under my care on February 27th, 1858. She had invariable good health up to three months ago. At that time she says she caught cold, her breath became short, and attended with some noise in the throat; she had slight cough, and expectoration of much colourless, glairy fluid. She got somewhat better, but had two or three recurrences of what she terms colds. During the last month she has been much worse; the breath has been much more difficult, and during the last week she has been unable to lie down; the cough has become more troublesome, and her expectoration, although of the same amount and character as before, has been brought up with greater difficulty (seems to stick in her throat). The cough has come on in severe paroxysms every few hours, and is relieved after a time by expectoration. She has had no sore throat, and has all along “felt bodily well.”

She looks anxious, and suffers from orthopnœa; her breathings are not very frequent, but are attended with a stridulous sound. The paroxysms of cough (which are very severe) consist of deep somewhat stridulous inspirations, each of which is followed by a series of spasmodic expirations, and by the kind of expectoration above described. During these attacks the face and neck become intensely congested, and the veins of the neck much swollen. The throat is not sore, neither the larynx nor the trachea is tender or swollen, the fauces look healthy, and she has no difficulty of swallowing, but her voice is hoarse. Chest resonant; respiratory sounds attended with much rhonchus (conveyed apparently from the trachea). Heart's sounds healthy. Pulse 96, regular, equal in both wrists.

Vin. Ant. Pot. Tart. ʒj. Tr. Hyosey. ʒss 4tis. Milk diet.

Hyd. Iodid. gr. j, t. d.

March 1st.—She seems considerably relieved; her voice is improved, and her breathing easier (though still very noisy), she lies down better and spits less. Her cough, however, is said to be more troublesome. She has slept badly. Her appetite is good, but the medicine makes her sick. Mouth not sore; bowels loose.

Mixture every 6 hours.

Pulv. Opii gr. ss with each pill.

Mixed diet and a glass of gin.

2nd.—Has had great distress of breathing all night and to-day, much pain between the shoulders, and says she is "troubled with wind." P. 88.

4th.—Seemed to be rather better yesterday morning, but got worse again in the afternoon, and has continued so ever since. Slept very badly last night, had great difficulty of breathing, and was unable to lie down. Complains of flatulence, which she says chokes her. Paroxysms of cough as severe as ever, and attended as before with expectoration. Tongue clean; appetite bad. Pulse 96.

Both sides of chest resonant; breath sounds more or less growling all over, but the sounds are altogether more feeble on the left side than on the right. Heart's sounds healthy. Whilst I was taking notes she had a very violent attack of coughing, which lasted for some minutes. During the attack she was several times nearly choked, and evidently in imminent danger; at the close she brought up a little frothy tenacious mucus.

In consultation with Dr. Barker it was determined to have tracheotomy performed.

The operation was performed about 4 p.m. It lasted about a quarter of an hour, and was attended with little bleeding. No immediate relief to the breath followed: the tube, indeed, caused considerable irritation and cough, and had to be removed several times. She brought up, during this time (chiefly through the mouth), a large quantity of frothy mucus. Finally, however, the tube was adjusted, and at 5½ p.m. she was breathing pretty comfortably, and expressed herself as feeling much relief. Pulse at the time 108. The relief, however, was very temporary, for by 7 p.m. her breathing had become much worse than ever it had been before; it continued in this state, attended with occasional cough and expectoration, until 2 a.m., when, at her urgent request, the tube was removed. She continued in the same condition after its removal, and in the morning about 5 evidently began to sink, her skin became very livid, she gradually became comatose, and at length died a little after 1 p.m. on the 5th.

Autopsy.—In fair condition. There was a vertical incision, about an inch long, immediately above the sternum.

Chest.—Upon opening the chest all the organs appeared to occupy their normal position. The pleurae were healthy, except that the base of the right lung was adherent to the diaphragm. The lungs were crepitant throughout, but not much inflated, and they were somewhat congested. The bronchial tubes were not injected, but contained more mucus than natural. Pericardium healthy. Heart small and healthy in every respect. The left ventricle contained a small fibrinous coagulum, which was prolonged into the aorta, and the right ventricle contained a similar clot of considerable size, which was continued as a thickish cylinder into the pulmonary artery. The ascending and transverse portions of the arch of the aorta were considerably dilated, and the walls were diseased and irregular. Here

and there were patches of atheroma, one of which was ruptured and broken down and had left an ulcer-like patch. But in the greater part of their extent the parietes appeared thinned, dark-coloured, and thickly studded with minute depressed points; in several of which a slight degree of bulging had taken place. A protrusion of this kind, as large as half a chestnut, existed between the origins of the innominate and left carotid. At the posterior and upper part of the transverse arch, immediately behind the origins of the left carotid and subclavian arteries, was a circular orifice, about an inch and a half in diameter, by which the aorta opened into an aneurism, nearly globular in shape, and about as large as a hen's egg. This projected backwards and upwards, and displaced the trachea and, in a less degree, the œsophagus, slightly to the right. The innominate artery was dilated to quite twice its normal size, and its walls were thickened, but the vessels springing from it were healthy. The left carotid and subclavian were probably pressed on, to some extent, by the aneurism, and their channels were considerably diminished by atheromatous thickening of their walls.

The œsophagus was, for the most part, healthy, but that portion of it which corresponded to the aneurism (a patch altogether about three quarters of an inch long and half an inch wide, situated to the left and anterior part of the tube) presented a dusky discolouration; the rugæ of its mucous membrane were obliterated, and its muscular tissue was incorporated with the aneurismal walls.

The larynx was perfectly healthy, presenting neither œdema nor any other marks of disease. The upper three rings of the trachea were vertically divided, having been cut through in the operation for tracheotomy; but otherwise the greater part of the trachea appeared healthy, though containing much frothy mucus. The lower inch and a half was much reduced in calibre, by the pressure of the aneurism on its left side. This, in fact, had been so great that the portion pressed on was rendered convex towards the right side, the mucous membrane, rings, and other parts, having equally partaken in the general bulging. The commencement of the left bronchus had also been subjected to pressure and its calibre was, in consequence, somewhat reduced.

The walls of the aneurism were formed chiefly of condensed connective tissue. The portions of œsophagus, trachea, and aneurism involved, assisted also in their formation. And to the left of the œsophagus the aneurism had become inseparably connected with the soft tissues attached to the spinal column. The interior of the aneurism was almost completely filled with laminated and decolourised coagula, but contained also a little recent clot.

The left recurrent laryngeal nerve was traced round the under surface of the tumour, and was gradually lost (apparently atrophied and destroyed) long before it reached either the trachea or œsophagus.

All the abdominal viscera were healthy.

The thoracic and abdominal aorta presented a little atheroma.

CASE 2.—Aneurism of transverse arch; paroxysmal dyspnoea; no loss of voice; compression of trachea; no affection of recurrent laryngeal.

J. F—, æt. 37, a railway guard (formerly in the army), had had fairly good health up to six months previous to his admission into the hospital on the 8th November, 1872. He then, as he says, caught cold, and he has had a steadily increasing cough, with dyspnoea, ever since. Began to expectorate nine weeks ago.

On careful examination a few days after admission, he was found to be a rather spare man, with a little duskiess of face and anxiety of aspect, suffering from dyspnoea, so that he was usually found sitting up in bed (his breathing being somewhat stridulous), liable to sudden exacerbations of dyspnoea, during which he had a harsh metallic cough, lasting until his face became extremely livid, and relieved by the bringing up of muco-purulent fluid. Of this latter he expectorated a considerable quantity. His chest was generally resonant, but at the inner part of the right apex in front, in a space of about a couple of square inches, there was obvious dulness, and pulsation which could be seen and felt. The inner extremity of the clavicle was elevated with each beat. There was no murmur in this situation, but the two cardiac sounds were louder here than they were over the cardiac region. A dilated vein was seen to descend from the neighbourhood of the thyroid gland, to cross over the inner extremity of the right clavicle, and then (close to the sternum) to sink into the first intercostal space. The subcutaneous veins on the right side of the chest in front were also enlarged, and appeared to empty themselves into it. When he coughed all these vessels became much distended. No tumour and no undue pulsation were discernible in the neck. Musical rhonchi were audible over both sides of the chest. The heart sounds were feeble but healthy. The right radial artery was almost pulseless; the left was normal. The pupils were equal. He had no impairment of voice, or difficulty of swallowing. There was no tenderness on pressure or percussion over the region of pulsation and dulness; but he complained of occasional pains about the right ear and right side of the neck, and on coughing at the angle of the right scapula.

He presented slight variations of symptoms from time to time, but on the whole rapidly got worse. The dulness extended from its original site, across the manubrium of the sternum, so as to include the inner ends of the left sternum and first rib, the pulsation and exaggerated cardiac sounds extending in an equal degree: the enlarged veins became more and more distinct, and the network of visible veins in the thoracic parietes became traceable into those of the abdomen. His dyspnoea became more severe, and his paroxysms of cough more frequent and more distressing. His expectoration also got more abundant and more purulent, and his lungs presented more and more local indications of congestion and bronchial accumulation. His breathing grew more stridulous or metallic in character, and his distress and anxiety increased. He had little or no pain or tenderness at any spot, and seemed to lose his neuralgic symptoms. His right pulse remained almost imperceptible, but there was no obvious dilatation of the veins of the right arm and no œdema. His voice though weak never lost its musical quality. He had no difficulty of swallowing until the day before his death, and his pulse up to that date never exceeded 116. It was always regular.

His death, which occurred at 3 p.m. on the 1st December, was at length gradual and easy.

He was treated mainly with mere palliatives, and the day before his death he seemed to receive a little comfort from smoking Eucalyptus cigars.

Post-mortem examination.—Body thin, but fairly muscular.

Chest.—Both apices and both bases of lungs somewhat adherent. Lower part of right upper lobe and almost whole of lower lobe solid, greyish, mottled with pink, granular, with some purulent infiltration and easily lacerable. Rest of lung fairly healthy. Left lung more bulky than right, oedematous and hyperæmic, some pneumonic consolidation at base. Bronchial tubes injected.

Trachea generally injected. A loss of mucous membrane about four inches below vocal cords, exposing part of tenth tracheal cartilaginous ring. The ulcerated portion measured about half an inch long by a quarter of an inch vertically. The tissue around it was very vividly injected, and the exposed tracheal ring was rough and eroded. The ring above (ninth) was almost bare. This part corresponded to a pouch of the aneurism described below, which pressed upon the trachea and had projected into it.

A tumour the size of a small orange was situated in the upper part of the thorax, chiefly to the right of the middle line, under the first rib, first interspace, and part of sternum. This was an aneurism of the transverse portion of the aorta, arising from that vessel by a circular orifice about an inch in diameter, in the situation of the origin of the innominate artery, which arose by a distinct trunk (afterwards dividing into carotid and subclavian) from the upper part of the aneurism. Its cavity contained a little laminated coagulum. Its walls were generally thick, except in front, where they were hardly separable from the mediastinal connective tissue, and behind where a thin-walled pouch projected into the trachea. The upper part of the superior cava and the right innominate vein were stretched over the aneurism and compressed and flattened by it. From its pervious portion arose a vein as large as a quill, passing directly forwards to the first intercostal space, where it communicated with the internal mammary vein, and with another vein of some size entering the chest through the first intercostal space. There was no pressure upon either recurrent laryngeal nerve.

The arch of the aorta was atheromatous, and somewhat irregular. The origins of the left carotid and subclavian were unaffected. Heart not enlarged, fairly healthy.

The liver was adherent to the diaphragm, and its capsule presented much fibrous thickening. Its substance was fairly natural. The other abdominal viscera were pretty healthy.

There was a scar (apparently syphilitic) on the penis; and the inguinal glands were hard, and presented some small yellow opaque masses.

CASE 3.—Hysterical aphonia and dyspnœa; tracheotomy; death from pneumothorax and pleurisy, due to the passage of trocar and cannula through the trachea into the apex of the right pleura.

F. S—, a female, æt. 36, was suffering some years ago from aphonia and diffi-

culty of breathing. The case was one that excited some interest in her medical attendant, who watched her carefully, suspecting, but not being quite sure upon that point, that the symptoms were hysterical. However, they increased in severity, and he at length judged it advisable, in consultation with a surgeon (now dead), that tracheotomy should be performed. The operation was done, the trocar and cannula were inserted, and immediate benefit appeared to result. The patient seemed relieved from that time. In about half an hour or so, perhaps rather less, she was again suffering from difficulty of breathing, and in an hour or two's time she was evidently very ill. The instrument was removed from the neck without result, and on a careful examination of the chest the whole of its right side was found distended with air (pneumothorax), and the lung collapsed. She died with symptoms of acute pleurisy in a couple of days. I may add that the case occurred before the laryngoscope was invented, and the thermometer had come into use as an agent in diagnosis.

Autopsy.—In good condition. An incision, about an inch long, occupying the mesial line of the neck, communicated with the trachea.

Pericardium and heart healthy, and occupying their normal position. The left pleura was slightly adherent in the greater part of its extent, the layer of adhesive lymph being excessively thin, and evidently of recent origin. There was fluid in the pleural cavity. Lung healthy and crepitant.

The right pleural cavity contained air and about a quart of turbid, yellowish fluid. The surface was covered with a thick layer of flocculent, yellowish lymph, septa and bands of which crossed the cavity in all directions. The lung, at first sight, was undistinguishable; it was collapsed and compressed against the posterior part of the pleura. The apex mounted very little higher than the right bronchus, but its base was spread over the diaphragm and slightly adherent to it.

A small and somewhat oblique opening, about a quarter of an inch long, was discovered in the anterior wall of the trachea, in the middle line, and about an inch below the lower border of the cricoid. On a level with this opening, and in the line where the tracheal rings terminate on the right side, was a second opening, which presented nearly the same characters as the first, but was somewhat smaller. There was a little congestion in the neighbourhood of these orifices, but the trachea seemed otherwise healthy. The larynx was perfectly healthy.

On passing a probe through the posterior orifice in the trachea it was found to pass obliquely to the right side, about half an inch behind the carotid artery and jugular vein, and then to open almost directly into a cavity about as large as a Spanish nut, the parietes of which presented evidence of inflammatory changes. The lower part of this cavity was directly continuous with the apex of the right pleura. The orifice of communication between them was capable of admitting a No. 10 catheter, and the pleural surface behind (for some little distance below it) was marked by a very obvious groove, which gradually became less and less distinct, in proportion to its distance from the orifice.

The right lung was perfectly healthy in texture.

All the abdominal viscera were healthy.

AN ATTEMPT TO EXPLAIN
THE CAUSE OF THE
FORMATION OF THE SPIRAL FIBRE IN
VEGETABLE CELLS AND VESSELS.

By J. S. BRISTOWE, M.D.

SOME years ago now, while lecturer on botany at the hospital, at a time when I had worked a good deal microscopically at the minute anatomy of vegetable tissues, and when I was deeply impressed with the accuracy of Mr. Rainey's researches (as indeed I still am) on the ascent and descent of the sap, and on the formation and structure of spiral vessels and ducts, I was induced, on the basis of these researches, to make for myself, and to teach, an explanation of the mode of formation of the spiral fibre in the interior of cells and vessels. I had never at that time seen any such explanation offered of the phenomenon in question, nor indeed (so far as I recollect) anything which claimed to be an explanation. My reading has not lain in the direction of botany for at least twelve or fourteen years, and I do not pretend to know whether during this period any light has been thrown on this point of vegetable physiology. But whether or not, I do not suppose that I shall be thought guilty of any serious crime if I presume to take up a page or two of these reports with a statement of my opinions upon it.

It is well known that spiral vessels derive their name from the fact that, in their fully-developed form, they consist of a nearly homogeneous membrane of cellulose, containing an elastic

transparent fibre of sclerogen coiled spirally within it, in such a manner that on the one hand it extends from end to end of the tube, and on the other hand (by its tendency to uncoil) presses against the outer wall of the tube, and keeps it distended. It is well known also that true spiral vessels and cells are formed only in rapidly growing parts, as in leaves, and on the inner surface of the ring of wood which immediately surrounds the pith. In cells and vessels which are found in other parts, as for example in the outer part of the first year's ring of wood, and throughout all rings of wood subsequently formed, no spiral fibre is ever found, but the sclerogen which lines them forms a lamina which is perforated more or less irregularly by round holes, or slits arranged more or less horizontally (that is, perpendicularly to the long diameter of the tube) and presents consequently a dotted or reticulated character.

To be a little more precise, an essential point of difference between the development of cells or vessels containing spiral fibres and those lined with a perforated sheet of sclerogen is this: that the former are developed in tissues which increase in length by interstitial growth, the latter are developed in tissues which are simply moulded on pre-existing formed tissues. Leaves, very early after their emergence from the bud, present their perfect form, and from their first beginnings until they attain their full size go on growing in all their parts, not simply by the addition of fresh matter to their edges, but also by actual expansion or enlargement of pre-existing structural elements. So it is with the medullary sheath or inner layer of the first-formed woody ring. This is formed only during the very earliest period of the growth of the stem or branch, at the time when it is soft and succulent and just emerging from the seed or bud, and when it, like the young leaf, grows interstitially as well as at its extremity, as is proved by the fact that the leaves which at one time are (say) an inch apart from one another upon it, are found ere long to be two inches apart. In these situations, as before stated, spiral cells and vessels are always found. On the other hand, the outer part of the first ring of wood (that part formed late in the summer or in the autumn), and all layers of wood formed subsequently to this, are simply laid, as it were, on a surface which has already attained its full growth; there is here no growth in the sense in which a young leaf or a young

stem grows; there is not, and there can be no growth in length, but only additions to the surface giving increased thickness.

Mr. Rainey's observations on the development of spiral vessels and ducts, and the various modifications of those organs, went to show that in their early beginnings there is little or no difference between them; that in all of them the sclerogen is deposited on the inner surface in the first instance as a transparent structureless more or less viscid layer; that soon circular pits or perforations appear in it; that then transverse slits (so-called "bars") are formed therein; and that, finally, by the union of these slits with one another in the direction of their length the layer of sclerogen becomes split up into a spiral band, or in some cases into rings, or possibly into more or less irregular intermediate figures; and that hence vessels and ducts present a uniform lining of sclerogen, or a dotted, barred, or spiral form of such lining, simply according to the stage at which their development becomes arrested.

It would thus seem clear, in the first place, that the spiral fibre is cut, as it were, out of a homogeneous layer by the formation in the latter of a spiral incision, and that the visible steps in the formation of the complete line of incision are, first, the appearance of pits, then of slits along that line; and that, in the second place, the spiral fibre becomes completely formed only in those parts in which there is free and unfettered growth.

But how is it that this line of incision assumes almost invariably a spiral direction, or how is it (for it comes to the same thing) that the slits which form it by their coalescence are almost invariably a little tilted individually, and follow one another end to end in a spiral line?

Before dealing with this question it will be well to consider how it is that pits form in the layer of sclerogen, and how it is, also, that they are distributed in it with some degree of uniformity. It will, of course, be admitted that sclerogen, being composed chemically of oxygen, hydrogen, and carbon only, is not a living tissue, and that it is incapable, therefore, of growth and development by means of any inherent power which belongs to it—that it is, in fact, of the nature of an excretion—and that any changes which it may undergo after its first deposition can only be mechanical or chemical. Now, sclerogen is, in the first

instance, a viscid substance, containing a comparatively large quantity of water, but by degrees it loses this and becomes dense and hard—a change in its constitution which must evidently be attended with a tendency to contract and to occupy less space. Assuming, then, that a fully-formed cell or tube (fully formed, that is to say, as to its outer wall) becomes lined with a layer of sclerogen in a viscid condition, and that this deposit slowly hardens and contracts (the wall itself remaining unaltered), what visible changes would it be likely to undergo? Either, as it seems to me, it would become detached, wholly or in part, from the outer wall, and lie more or less loose amongst the other cell-contents, or else (while retaining its connection with the wall) it would, if sufficiently ductile, become uniformly thinner—if imperfectly ductile, torn. The tendency to detachment of the sclerogen from the wall is counteracted by two circumstances—one, the close adhesion existing between those parts; the other, the close coaptation of them which is maintained by the constant distension of the cell or tube by its fluid or semi-fluid contents; yet such detachment does take place in some instances, and, probably, always in the case of the fully-formed spiral vessel. Again, there can be no doubt that attenuation of the sclerogenous layer does actually take place, although, from the nature of things, the phenomenon is one not easy of demonstration. But there is also no doubt that, in the majority of cases, this layer becomes early pitted. Now, what are these pits but lacerations, and a proof of the general occurrence of the third of the alternatives which I have enumerated?

It may be objected to this view of the nature of the pits, first, that they are circular in outline; and, second, that they are uniformly distributed, and that neither of these conditions seems compatible with it. But in reference to the former of these objections, it must be borne in mind that when elastic substances on the stretch (as, for example, a thin sheet of india rubber) become lacerated at points, the lacerations do really tend to assume a circular shape, and that this tendency is yet more marked when they occur in a lamina which is not only elastic but viscid. Every one knows that the post-mortem lacerations which are not infrequently met with in the softened mucous membrane of the stomach often acquire a perfectly circular form. But there is another group of pathological phenomena which

affords a yet better illustration. Whenever a liver or spleen or lung becomes invested in layers of false membrane, these tend to contract upon the organ, and at length by contracting modify its shape. The organ, on the other hand, opposes the contractile tendency of the false membrane, and consequently the membrane as well as the organ is compelled to yield; and before long we find what was at first a uniform lamina presenting numerous pits or actual perforations, and so becoming fenestrated. These pits or perforations are almost invariably circular, and are yet undoubtedly the result, in the first instance, of simple laceration. I may add that, without exception, so far as I know, similar circular pits appear in the walls of ovarian and other cysts which are increasing in size, and that these (which also originate in mere laceration), by gradually increasing in area and depth, lead to perforation of the wall; and that it is, in fact, chiefly by such means that ovarian cysts open, on the one hand, into the peritoneal cavity, and, on the other come to communicate with one another and to blend.

In reference to the latter objection—that, namely, furnished by the uniformity of their distribution—a little consideration will, I think, make it clear that, so far from being an objection, the uniformity of their distribution is confirmatory of the truth of my opinion. For inasmuch as all points in the sclerogenous layer are necessarily influenced, as nearly as possible equally, by the force which tends to make it shrink, and by the force which opposes its shrinking, there is no reason why laceration should occur at any other point of its surface, rather than at any other point, and hence (assuming that the membrane must give) it is most consonant with the conditions of the problem that this “giving” should be general; in other words, that the perforations in it should be numerous and pretty uniformly distributed.

It has been assumed throughout the above argument that the cell or duct wall has been passive. I need perhaps scarcely remark that my argument applies with much more force to the case of cells and vessels which are actively growing, and in which the stretching of the sclerogen due to their growth co-operates with the tendency of the sclerogen itself to contract, in effecting the changes which have been described; and it applies especially,

therefore, to that period of their life in which it is well known that such changes chiefly take place.

To return now to the question of the formation of the spiral. Whenever a piece of ribbon or slip of paper is stretched in the direction of its length by opposed and gradually increasing forces, a moment comes when it parts asunder, the tear thus parting it taking a transverse direction, or one at right angles to that in which the forces producing it are acting. If, instead of a piece of ribbon or a slip of paper, a square of paper or of some woven fabric be similarly treated, the effect (*cæteris paribus*) will be the same; that is to say, if the material be of uniform strength, and if the opposing forces applied to any two opposite sides of the square act uniformly throughout the whole length of those sides, laceration will ultimately occur in this, as in the former case, at right angles to the forces causing laceration. And again, if a similar application of force be made to each of the four sides of the square, laceration will again ensue, but the laceration now, instead of running parallel to the sides, will assume an intermediate or diagonal course, running, in fact, in the direction of two opposite corners.

The principle here illustrated is that of parallelogram of forces. Let us apply it to the case of a vessel or cell in some actively growing part, say a leaf. This increases in length partly by interstitial growth, and as it grows the already deposited sclerogenous lining becomes stretched longitudinally, and hence tends to tear transversely, a tendency which is increased by that of the sclerogen itself to contract; but it grows at the same time and in like manner in breadth, and hence (again aided by its own contraction) the sclerogenous lining tends to tear longitudinally as well as transversely; and obviously the joint operation of these two tendencies must be to evoke an actual tendency to laceration in a direction intermediate between them; in other words, a tendency to laceration along an oblique line, which, if prolonged, would necessarily take a spiral course around the tube. If these forces should operate in the case of a vessel or cell, lined with a layer of sclerogen already thickly pitted, it is clear, not only that neighbouring pits would tear into one another, but that for the most part (if not uniformly and without exception) those only would thus communicate with one another which lie at right angles to the

line of direction of the resultant force, and hence that they would so coalesce as first to form oblique slits, and ultimately (by a continuance of the same process) a spiral fissure dividing the sclerogenous lamina into a spiral band or thread.

It follows from this view of the mode of formation of the spiral that the degree of its obliquity will be determined by the ratio which the force by which the cell grows in length and that by which it grows in breadth bear to one another. The more the growth of the cell in breadth increases relatively to its growth in length the more oblique will the direction of the spiral become; and the more its growth in length increases relatively to its growth in breadth the less will be that obliquity, until at last, when growth takes place in length only, the obliquity will cease altogether, and the sclerogen break up into horizontal rings. It follows also from this view that the greater the obliquity of the spiral fissure at the time of its first formation the greater either will be the breadth of the resulting spiral band, or the greater will be the number of parallel spiral threads resulting from its subdivision.

The spiral fibre takes sometimes a right-handed course, sometimes a left-handed one; and it is obvious that the explanation I have suggested is impartially applicable to either case. Indeed, so far it might seem a simple matter of chance which of two directions opposite to one another, but equivalent as regards their relation to the two primary forces, the line of fission might take. No doubt in every case there is some sufficient determining cause, even though we altogether fail to detect it. I may, however, point out that (in strict accordance with the principles of my explanation) any slight deviation of the lines of direction of the two primary forces from their hitherto assumed rectangular relationship to one another would be amply sufficient to determine, in accordance with the direction of that deviation, the direction of the spiral itself to one or the other side. If, for example, the inclination of the lines of force be to the right the course of the spiral will be determined to the left; if the inclination be to the left the course of the spiral will be determined to the right.

But if my explanation of the formation of the spiral fibre from a pre-existing pitted lamina of sclerogen be true, the operation of the principle of the parallelogram of forces may, I think, be safely extended. There can then be no doubt, I think,

that it commences from the very first moment in which the deposition of sclerogen has taken place ; and although at that time it is attended with no visible manifestation, it is probably even then slowly effecting some modification in the molecular condition of the sclerogen, which makes it apt to split in the direction in which splitting ultimately occurs, and which also tends, in some degree, to regulate the distribution of the pits which precede that splitting. And I think I may venture to add that under such influences it seems not improbable that the layer of sclerogen might sometimes split into a spiral band without ever presenting any of those intermediate anatomical conditions which I have hitherto assumed to be necessary steps in the formation of the complete spiral.

In conclusion, I may be permitted to observe that the various characters presented by the sclerogenous lining of cells and vessels are, in nearly all cases (I think), easily explicable in accordance with the hypothesis which I have advanced, especially if due allowance be made for the counteracting influences which irregularity or special form of cavities, or irregularity or eccentricity of growth of cells, or peculiarities of formation in them are, alone or in combination, likely to exert. I have been told that the presence of compound spirals in cells—of spirals, that is to say, taking opposite directions—is fatal to the truth of my explanation. I fail, however, to see the difficulty, for it is obvious that the different spirals must have originated in different layers of sclerogen, and that my explanation is as applicable to the case of each spiral taken separately as it is to the case of the simple spiral which alone exists in the great majority of spiral vessels.

ON THE RELATION OF GOUT TO URIC ACID.

By W. M. ORD, M.B., M.R.C.P.

“Omnes animi nervos hujusce morbi phænomenis contemplantis acriter intendens, illum ἀπεψία, seu labefactatæ tam in partibus quam in succis corporis universi concoctioni, ortum debere existimo.”—SYDENHAM, *Tractatus de Podagrâ*, cap. 17.

THE word concoction, used in the above passage much in the sense of the current word assimilation, has probably gone into disuse because it kept doubtful company, bore too plainly the badge of a party that had fallen out of credit. Fairly judged, it seems still worthy of a place in our vocabulary, being perhaps after all quite as applicable to the purpose, and quite as comprehensive in its meaning as the term assimilation, which indeed regards rather the end than the several stages of the process denoted.¹ The concoction of nutritious matters within the body may in fact be taken to include the several processes of digestion, of primary and secondary assimilation (as Prout used the terms) and of natural decay or degeneration, qualitative and excretory—degeneration of tissue and of chemical form. The context shows that a very wide meaning may be carried by the word, and that Sydenham, although some have sought to brand him with the name of humoralist,² held far

¹ Compare the expression “θρεπτικὴ δύναμις,” of Paulus Ægineta, lib. iii, cap. 78.

² Scudamore, for instance, speaks thus of Sydenham:—“His doctrines upon gout, conceived in the full force of the humoral pathology, have had even to the present day a most injurious influence on practice.”—*A Treatise on the Nature and Cure of Gout and Gravel*, 4th ed., 1823.

from narrow views of the origin and nature of gout. For it is difficult to see how the phrase "*tam in partibus quam in succis corporis universi*" can be interpreted otherwise than to indicate that the "impaired concoction" affected, in Sydenham's opinion, the quality of the solids as well as of the fluids of the whole body. Ill-concocted tissues tending to decay in hasty irregular fashion, and coming to be choked with the unmanageable products of their own faulty chemistry; the same tissues inflaming in hasty irregular fashion, and infecting the blood and other tissues with matters irritating or hard to be excreted; the tissues so ill-concocted by inheritance, by defect or fault of food, of digestion, of regimen. This is the sort of picture of the origin of gout which is suggested by Sydenham's pithy sentence. The same picture with changed name might stand for several allied ailments or diatheses,—for acute rheumatism, for the mischiefs included under the terms chronic rheumatism, rheumatoid arthritis, &c., and for gout proper as defined by recent writers. And it will be suggested in this paper that the cause of gout will be better understood by a careful view of its natural history and relationship than by an exclusive or egregious attention to certain of the accidents of the disease.

In this country no one exerts probably so much influence upon the current ideas of gout as Dr. Garrod. No one has a better right to exert strong influence than the accomplished physician and chemist who detected the excess of uric acid existing as urate of soda in the blood, and has since by patient and conscientious observation put this and similar discoveries beyond the reach of doubt. The latest exposition of Dr. Garrod's views is presumably to be found in his article on gout in the first volume of the system of medicine edited by Dr. Russell Reynolds (1870). At page 883 *et seq* three propositions are offered:—

"1st. That it is essential to the production of this form of articular inflammation that the blood should contain an abnormal amount of uric acid, or rather of urate of soda; and even the phenomena which constitute irregular gout, or are regarded as gouty manifestations, demand for their manifestation the presence of the same salt in the circulating fluid

"2nd. That gouty inflammation is invariably accompanied with the presence of urate of soda in the inflamed tissue.

"3rd. It can be shown that the amount of deposited urate is not in proportion to the intensity of the inflammation, and that in some structures the infiltration may ensue and scarcely give rise to any inflammatory action; facts tending to the supposition that the deposited matter may be looked upon as the cause rather than the effect of such inflammation."

In an earlier paper¹ Dr. Garrod had spoken of the excess of urate of soda in the blood, and the deposit in the joints as pathognomonic of gout, in such a way that gout might thereby be decisively defined from rheumatism. The propositions, therefore, declare an advance in speculation. The urate of soda rises from a sign to be a *materies morbi*, and the deposit of urate in the cartilages and ligamentous structures of joints comes to indicate that these tissues are selected as agents in freeing the blood of the excess; certain joints being usually the first affected, and afterwards, "the blood still remaining impure from the presence of the salt, other surfaces" requiring to be "selected." As nearly then as possible gout here returns to its derivative meaning of a dropping (*gutta*) of morbid matter into joints. The excess of the urate is held to be explained partly by defective excretory power (the kidneys being in fault), partly by undue formation of uric acid in the system.

There is so much attraction for men's minds in the neatness of a compact hypothesis that this idea of the proximate cause of gout is apt to be carried away by a reader of Dr. Garrod's article with far less qualification than the author would probably desire.² Indeed, he is careful to guard against the routine practice which would naturally follow upon the simple acceptance of the idea by pointing out that "each individual case not only exhibits its own peculiarities and becomes a separate study, but likewise demands in certain respects a separate treatment."

But even when this qualification is properly recognised, the

¹ 'Medico-Chirurgical Transactions,' 1854, "On Gout and Rheumatism," p. 219. But in 1848 ('Med.-Chir. Trans.') the *materies morbi* idea was already indicated.

² *Vide* Gairdner 'On Gout,' p. 96 et seq.

conception of the cause of gout suggested in the above propositions is insufficient. It is still of first importance to regard gout as a mode of decay; to regard a gouty man as a man whose journey to the grave leads through definite regions of textural degeneration. The excess and deposit of uric acid are notable accidents of the way; are possibly efficient causes of much of what is most characteristic in the journey. But in errors of the entire process of nutrition—of primary concoction of the body, of concoction of introduced matters subservient to nutrition, of concoction of matters that have subserved nutrition and are to be removed—must be sought the explanation of that loosening and poisoning of the system to which, as I would urge, gout may be reduced.

Taking it to be a fact that uric acid is deposited in combination with soda within the joints of the gouty system, does this in the first place necessarily mean that the acid is poured out in order to free the blood of its presence? The sum of evidence seems to me against the necessity. Uric acid is universally allowed to be a product of the disintegration of the tissues or of the food; it is a substance of little solubility as compared, for instance, with the allied substance urea; and for this reason among others is not removable in large quantity from the blood by the kidneys; for the same reason, if formed within the tissues, it will not be removable in large quantity by the blood. Now, when we find a halo of fat round the margin of the cornea, a tissue nearly allied to joint-cartilage, we do not infer that the blood is too full of fat and that the cornea has been selected as an organ of elimination. All the language used respecting arcus senilis is on the contrary fitted to an idea of degeneration of the cornea having for one result the deposit within the corneal tissue of the comparatively insoluble matter, fat. When, again, we find crystals of cholesterine in an old sebaceous cyst or in an advanced atheroma, we similarly have suggested to us ideas of local degeneration and of immobility of the resulting substance. In the same way the presence of urate of soda in parts of the body remote from the centre of the circulation, in tissues of little vascularity and low activity, may be taken to be a mark of a certain kind of degeneration or want of organisation of those tissues, or of the juice thrown out from the blood for their use. Moreover the symptoms of general disorder which

gouty patients exhibit may be taken to be a mark of a corresponding process of degeneration or want of organisation affecting other organs and tissues under conditions which less readily permit the deposit or less hinder the removal of the urate.

A second question now arises: Is it necessary to assume that the deposited matter is either the cause or the effect of gouty inflammation? As Dr. Garrod himself remarks, gouty deposit does occur in the cartilage of the external ear without any recognised preceding inflammation; and in the case of joints "which have become callous" considerable deposition may be shown to occur without the production of much local inflammation. Whenever, indeed, such deposits are meddled with, even in the gentlest way, sharp gouty inflammation always follows. Among the out-patients attending at this hospital during the past summer was a woman, aged 52, very anæmic and anxious-looking, and so weak as to require assistance in entering the room. On the outside of each foot, adjoining the metatarso-phalangeal articulation of the little toe, projected a yellowish-white round swelling, fluctuating freely, with exceedingly thin investing walls. It was supposed that these swellings were of gouty nature. In order to determine the point a tiny incision was made obliquely with a tenotomy knife, and after the out-flowing of a drop of the contents was carefully closed. The problem was soon doubly solved. Crowds of small separate crystals of urate of soda were found in the glairy opalescent fluid; and within two days the patient had a violent attack of gouty inflammation of the outside of the foot, leading eventually to the absorption of a great part of the contents of the cyst. What occurred here was, I would suggest, the very thing that occurs in a large proportion of cases of gouty inflammation. There was, first, a distinct mechanical injury, causing a part of low vitality to inflame inordinately; and, secondly, the part thus affected inflamed in a way related with its mode of weakness,—it inflamed in a gouty way. These are the conditions. Taken the deposit or the gouty constitution alone, or the injury alone, gouty inflammation does not follow. People may have their blood full of urate, as Dr. Garrod shows, without having gout. People may, again, have their great toe-joints injured and injured again till they almost cease to be joints, but

no gout comes. Dr. Garrod gives some curious information upon this point agreeing with observations which I have myself, from time to time, since made. They are to the effect that the great toe joint is constantly found to be the seat of unsuspected mischief. In twenty cases where the great toe joints of persons who had never had gout were examined after death a healthy state of the joint existed only in six; in all the rest "there was more or less evidence of ulceration of the cartilages." Assuming these facts to be of general application it becomes easy to understand why in a large majority of gouty persons the first attack of the characteristic inflammation should occur much more frequently in the great toe-joint than elsewhere. Sir Charles Scudamore gives a table of 516 cases of gout in which the part first affected was noted. One or both great toes alone were affected in 341 instances, or nearly two thirds; in 31 other cases the great toe was attacked together with other parts of the foot; in less than 20 cases out of the whole was the lower extremity in one joint or other not included among the parts affected. In a word, the lower extremity, which has to bear the greatest strains in the exertions of ordinary life, is mainly the scene of the first appearance of gouty inflammation. Moreover, as bearing strongly upon the proposition that local conditions determine the local outbreak, I may quote the following observation of Sir Charles Scudamore: "I find that in examples of hereditary gout the great toe has been the situation first chosen, and that the most remarkable exceptions have been in those persons who have wholly acquired the disease." When the whole body is uniformly stamped with the gouty character the inflammation naturally first affects those parts which in the average of human life most commonly have their vitality lowered or incur injury. In acquired gout it is altogether otherwise. Acquired gout means mostly the degeneration of the body in general, consequent upon default of particular organs of digestion and assimilation. These organs, therefore, take the place of the great toe as the weakest part of the body, and become the first seat of gouty inflammation.

I have been speaking chiefly of first attacks. But the daily experience of gouty cases goes to connect every fresh attack with distinct exciting causes. A long walk, a wrench of a joint, a fall, violent nervous excitement or anxiety, an attack of

indigestion, are so many examples of constantly recognised agencies. These have at least one condition in common—a disturbance of the circulation in some part of the body. The temporary congestions of the healthy man are represented by the characteristic inflammation in the gouty man. I may take here as an illustration the case of a gentleman who was for some years under my observation. By a superb disregard of all ordinary care in living he had engrafted gout upon a constitution of far more than ordinary natural vigour. When I first saw him the feet and hands were already much distorted by gouty deposit, but the attacks of gouty inflammation chiefly affected the abdominal viscera—the intestines in particular. His mind was possessed with the idea that free purging was the true and only remedy for gout; and this remedy used for years had brought him to such habit of constipation that nothing short of croton oil in large doses could now procure relief. After finding himself more than once at death's door through abdominal inflammations he consented to be treated with more gentleness; and at length, by the use of dilute saline solutions and enemata, the bowels were induced to act regularly and easily. Thereupon the abdominal attacks ceased, and his health improved. So long as he remained quiet his joints remained free from inflammation, but occasionally a long walk would be followed by gouty inflammation in the feet and knees. He died at last of severe gouty inflammation. Hurrying along one day in the city he tripped over a brewer's rope and fell full length upon the pavement. The shock was severe, but he speedily rallied, and was to all appearance quite recovered by the evening. But the next day he had gouty inflammation in nearly every joint of his body and in the membranes of the spinal cord. Under this combination he soon sank. His kidneys gave at no time any indications of congestion or impairment of function, and throughout my observation of him his attacks of gouty inflammation were always capable of explanation by local causes of excitement. And this I maintain is a constant experience in gouty cases. On the other hand, it is necessary to admit that uric acid is something more than a sign of gout, and is capable of irritating and causing inflammation of tissues. Like other chemical products of waste it seems when present in too large proportion to hinder the functions and impair the nutrition

of the tissues. And any cause which tends to pour an excess of urate of soda suddenly into the blood may thereby cause inflammation of parts already obstructed and of lowered vitality. The extension of gouty inflammation from joint to joint may be, in part, effected by the poisoning of the blood consequent on the rapid decomposition of the part first affected. I have certainly seen gouty inflammation set up in distant parts under circumstances which permitted the entrance of urate of soda into the blood from a part not at the time inflamed. A gentleman aged now about 44, a sufferer from gout since his seventeenth year, has large chalkstones in the heels of both feet. These concretions have given rise to suppuration, but are so entangled with the living tissues that they cannot be removed; they remain therefore in the centre of large angry and painful granulations, and are a source of great distress. On three occasions I have applied solution of iodide of potassium to these with the double object of promoting their solution and of freeing them from the textural web. On all these occasions relief of local irritation has been followed by the establishment of gouty inflammation in distant parts. My own observations, indeed, accord with the facts upon which Dr. Garrod founds the statement that "the inflammation of the gouty paroxysm tends to the destruction of the urate of soda in the blood of the inflamed part." But it would be a necessary consequence of the greater flow of the blood through the affected part that much urate and probably much allied stuff should be at first swept into the circulation, even if afterwards, when the inflammatory process should have been established and the temperature of the part and of the body raised, much urate in the part and elsewhere should be burnt up. It is (I may remark) certainly the case that in violent gouty inflammation a sudden local formation of urate may take place. A gentleman already too familiar with the course of gout having been attacked one night with a pain in the ankle altogether exceeding all his former experience, applied on lint with a covering of oiled silk a mixture of equal parts of the liniments of belladonna and chloroform. When I saw him, two days after, the ankle was enormously swollen; there was extensive fluctuation over and below both malleoli; and a crown-piece area of skin was on each side discoloured and insensible. The skin giving way on both sides, a large

quantity of thick dark fluid containing much decomposed blood, a little pus, and large quantities of small acicular crystals of urate of soda was set free. There must have been at least fifty or sixty grains of the salt in about three ounces of the fluid which were caught on lint. The large formation of uric acid must here have taken place in the part, and was in evident relation with the severity of the inflammation. There was no such mitigation of the severity of inflammation in other joints as might have suggested that the uric acid was seeking an outlet at the ankle. They were indeed rather worse treated than was usual, and there was no notable, if any, subsequent relief of gouty symptoms. In illustration of the peculiar nature of gouty inflammation it is worthy of note that, even though the ankle had been as it were perforated, complete healing followed on both sides of the joint; and that the patient, a man of eighteen stone, was able to walk within three months, with the aid of sticks.

The extension of gouty inflammation, however, does not require the interference of uric acid for its explanation. As it is certain that in many cases simple inflammation is propagated from part to part by nerve influence, it is not illogical to assume that this may occur in gout. I have seen in several instances local inflammation like those of rheumatoid arthritis originate in local causes, and spread in a way that was more attributable to nerve influence than any other cause which I could imagine. One case in particular I was enabled to follow throughout its history. A lady, who had reached the age of 82, without failing in her intellect, senses, or muscular powers, and who lived an easy, well-regulated life, struck one day the metacarpo-phalangeal joint of the forefinger of the left hand a very sharp blow with a key. A pain as sharp as the blow followed, and the next day the knuckle was swollen and tender. The swelling became hard, the tenderness continued and the pain extended up the arm, in spite of all kinds of local applications, including subcutaneous injections of morphia. The part had all the appearance of being affected with rheumatoid arthritis. At the end of a month the first joint of the thumb became similarly affected, and, later on, the wrist. At the same time as the wrist the first joint of the index finger of the other arm swelled up in the same way. Both hands eventually became

almost useless. When a year had passed the hips and knees were swollen and fixed, making the poor lady a prisoner to her room. Finally, a slow invasion of congestion occurred in the lungs, and led to her death about eighteen months after the receipt of the injury. The case has been always for me typical as showing how, even if the several parts of the system be ripe for dissolution, the evil day is held off as long as no sufficient local excitement occur to fire the train. And the local cause here was one of much severity as regarded pain. There was so much suffering of a neuralgic kind in the knuckle first struck as to create a strong impression that some nervous structure, a twig or some large touch-corpuscle for instance, had been crushed; and in reviewing the case I have often thought that section of nerve, or the long-continued use of constant galvanic currents along the course of the nerve, might have kept the mischief from spreading. For the history leaves no doubt in my mind but that reflex nerve influence was the agency by which the local ailment became ultimately a general and mortal disease.

So in gout proper I believe that the influence of the part upon the system through reflex nervous agency must be regarded as most important.

Dr. Gairdner, in his most philosophical work on gout, quotes from Sir William Temple an account of an Indian cure, consisting in the application of a moxa to a gouty part in the early stage of an attack. This, according to Sir W. Temple, arrested the whole process, and must have acted in the same way as the blisters frequently applied to the affected joints in cases of acute rheumatism. The tendency of the inflammation to spread by reflex nervous action would of course be far greater in gout than in ordinary course of inflammation, in consequence of the readiness with which gouty parts inflame. And assuredly whatever treatment shall succeed in limiting the inflammatory action to the part first inflamed must be regarded as of the first importance. The best observers are coming more and more to the opinion that in acute rheumatism there is an original affection of the part due to overuse or other depressing injury, and afterwards infection of the system from the part. In that terrible disease it is certainly possible by wise precaution to avert the local trouble, and a great deal may be done to limit

the extension; rest being perhaps the most effectual agency. The local counter-irritation and the various means at present possessed of numbing those nerves through which "constitutional irritation" may be set up, must, I am persuaded, come into use if gout is to be checked and held within bounds. Among these means galvanic currents and subcutaneous injections suggest themselves to me as deserving careful trial.

If the nervous system acts in propagating gouty inflammation by reflex action, there is also a direct influence of the nervous system in gout. Sydenham's whimsical self-gratulation on the goodly fellowship in which being gouty he found himself will be in everybody's memory.¹ The importance which he attached to the direct influence of the nervous system is well shown in another passage (cap. 53): "*Quinimo animi tranquillitas omni spe stabilienda est, cum perturbationes omnes, si repagula semel effringunt, ad solvendam spirituum (qui sunt digestionum instrumenta) systasin, ac proinde ad podagræ incrementum, multum faciunt.*" In one way or another this influence has been admitted by all authors since. Dr. Gairdner, for instance, used to quote his own experience of the great amount of gouty trouble which came under his notice among members of parliament, parliamentary lawyers and agents, &c., towards the end of a session, in illustration of the developing influence of nervous excitement and exhaustion. The nutrition of the body is constantly affected in a visible way by the state of the nervous system. And, given any degree of proclivity to gout, it will be likely to follow that the gouty condition will be induced by long-continued weakness of the nervous system. Given also the gouty diathesis, sudden excitement of the nervous system is capable of producing gouty inflammation often in a violent form and in several parts at once. The direct action of the nervous system is constantly at work in producing local irregularities of the circulation, and local derangements of chemical action. Blushing, the headache and hot pains in the limbs which follow on prolonged anxiety, and weeping are examples of the one; the poisoning of a mother's milk by mental shock, and the foul breath of mental distress are examples of the other. In gouty people the step from congestion to inflammation is so short that no elaborate argu-

¹ '*De Podagra*,' cap. xv. "*At vero fatuos,*" *et seq.*

ment is needed to show how readily general nervous disorder of a sudden kind will produce local gouty inflammation. On the other hand cases are frequently met with in which a strong will can fight down the gout. A lady of my acquaintance had been accustomed to have gout once or twice a year. She used, with something of Sydenham's complacency, to comfort herself with the idea of having an aristocratic disease, and was indeed rather proud of the fact that she almost invariably had the gout when it was announced in the papers that the late Lord Derby was laid up with it. Two years ago her husband became through an accident a confirmed and helpless invalid, and from that time her attacks ceased till, within the last few weeks, a feverish catarrh, induced by incautious exposure to the weather, ended in a severe attack of gout affecting both feet, both knees, one hand and elbow, and the nerves of the head and neck. The existing cause being here both violent and general, the resulting attacks were both violent and general. Several times when I have remarked upon the absence of gouty attacks she has replied that she could not afford to have them. She has plainly fought the gout down under circumstances of anxiety, fatigue, and exertion which greatly tended to excite it. Unfortunately it is not every one who has such strength of will. But Dr. Gairdner quotes several similar instances from his own observation, and from that of others; and the expression of "walking off" the gout that one may sometimes hear sportsmen use indicates a like exertion of the will.¹

There is also good reason to refer to the influence of the nervous system that class of exceptional cases in which gouty persons defy with impunity the received laws of diet and regimen. Occasionally people are met with who, after repeated attacks of gout, have given themselves up in vain to rigorous treatment. Restriction of diet, particularly in respect of liquors, regulation of exercise, the steady use of medicines supposed to be eliminant of uric acid and of other recognised drugs; all these are submitted to for a long time. At length, no cessation of the trouble being obtained, the patient disappears from observation, and meeting his medical adviser a year or so afterwards tells him he never has the gout now, and lives just as he likes, taking

¹ Cf. Van Swieten's commentaries 'On Gout,' sect. 1261, for the case of the dancing-master, and an apt quotation from Lucian.

the forbidden port and champagne, and eating heartily. The patient who tells this story is always, as far as I have seen, a robust muscular man actively engaged in anxious business; and a probable explanation of the phenomenon is that the brain is unequal without the stimulation of the alcohol to supply the calls of both mind and body. The end of such cases is of course never satisfactory, and I cite them not for approval of the practice but in illustration.

The foregoing considerations lead to a different interpretation of the influence of lead-poisoning in causing gout from that offered by Dr. Garrod. It is fairly conceivable that an impregnation of the system which causes paralysis, colic, and marked unhealthy state of skin and mucous membrane, should determine a general tendency to decay of a chemical kind, and that the undue formation of the uric acid should be a part of this decay. The kidneys, sharing the general disorder, would also fail in the proper discharge of their functions and thereby intensify the unfavourable condition. But no one would, I think, attribute the paralysis, colic, &c., simply to deficient action of the kidneys, and consequent poisoning of the system. Granting that the blood is by one local affection kept more than naturally charged with urate, the fact of the definite occurrence of the gouty process of inflammation must still be explained by the altered condition of the tissues. To dwell simply upon the depravation of the renal function is here again to keep the attention fixed upon one prominent symptom—upon one necessary reaction of a poisoning of the whole organization—making light of the indications, afforded by a variety of specific derangements in other functions, that lead combines with several tissues so as to cause them to depart in a degenerative way from healthy reaction.

There remains one consideration of much importance in the more or less pronounced improvement of the general health which follows a fit of the gout. If it is true that the hopefulness of human minds has much exaggerated the extent of this improvement, its occurrence is nevertheless to be observed in many early attacks of gout. Dr. Garrod offers evidence that during the gouty inflammation "the blood loses to a great extent, if not entirely, the morbid condition which previously existed, and hence the disappearance of the malaise." It is

already noted as probable that during the inflammation much morbid matter is burnt up. Where uric acid accumulates two important conditions commonly obtain—deficiency of arterial and stagnation of venous blood; and the parts where the accumulation is most common are parts that are much cooler than the rest of the body. Access of oxygen and rise of temperature may be readily conceived to favour the combustion of uric acid and similar matters. In the gouty system the various organs will always be to some extent charged with the products of their once incomplete or hasty decomposition. Now, it is a well-established doctrine in physiology that tissues are poisoned by the accumulated results of their own waste. If extractive of muscle be injected into the vessels of a muscle the subsequent application of ordinary stimuli will fail to produce any active contraction. But the muscle is only poisoned, not killed, and, if the vessels are well cleared out with water, will resume its power of active contractility. The feeble muscular power of cyanosis and the incapacity of continued exertion in the subjects of acute rheumatism belong to the same list. If in gouty inflammation a quantity of urate that has been poisoning certain tissues be removed it is conceivable that those tissues shall give better signs of health afterwards. Moreover in a few cases the gouty condition having been produced by temporary influences the tissues may have sufficient vigour to nourish themselves better than before the attack, being freed from the obstructive matters. For, other things being equal, the nutrition of a tissue is active in proportion as the extractive is readily removed. Animals, for instance, fatten best and most healthily when freely supplied with water. It can be understood, therefore, how in a limited number of cases abatement of many local distresses and even some improvement in health may follow a sharp attack of gouty inflammation in a part.

But recurring inflammations proceed inexorably to damage the quality of all the tissues, and diminish their power of recovery even if freed from their incumbrance; and it is more than doubtful if the felicitations usually addressed to a man who, having been out of sorts, has a good fit of the gout have any merit of appropriateness, excepting where gouty inflammation has been transferred from internal organs to an extremity. To avert local attacks and to hinder the extension of inflammation must

be the aim of intelligent practice. In the accomplishment of the first object the old rules of regimen will still hold good. In the way of remedies eliminant medicines, among which pure water should hold a high rank, must be regarded as of high value; and to their use must be added the adoption of all possible measures to promote the concoction of healthy tissue, such as the use of cod-liver oil, of milk and fatty foods, and of good meats in moderate quantity, and the administration of tonics of various kinds, such as iron, arsenic, and the vegetable bitters. We must do all we can to wash away the offending extractive, and we must not neglect to make our process of repair and refitting as perfect as possible.

The foregoing remarks upon gout may be summed up as follows:—

1. Gout is a mode of decay of the whole system, marked by the deposit of urate of soda in and about joints, and by local inflammation of a particular kind.

2. The deposit of the urate is a result of local or general disintegration, and is not to be regarded as a means of eliminating urate from the blood.

3. The local inflammations do not necessarily depend upon the deposit of urate, and the deposit is not a consequence of inflammation; at the same time it is probable that excess of urate in the blood produces irritation of tissues.

4. The local inflammation is peculiar in respect of the ease with which it is produced, of the pain by which it is attended, and of the products, which are chemical rather than structural; chemical substance of low molecule, tending to crystallize or to be dissolved, being formed in the part, instead of substances of high molecule tending to be organized. Interstitial subcrystalline deposit is common, suppuration rare, in gout.

5. The local inflammations are set going by local exciting causes.

6. The local degenerations and inflammations tend to infect the rest of the system through the blood, and to set up similar actions elsewhere through reflex nervous action.

STATISTICS
OF
TWO THOUSAND FOUR HUNDRED AND
ONE CASES OF HERNIA.

By JOHN CROFT, F.R.C.S.

As reliable statistics of hernia are not common, these figures, derived from my records of the National Truss Society, may be interesting and instructive.

From January 1st, 1863, to July 1st, 1869 (the six months ending July 1st, 1864, omitted), and during the year 1870, a period altogether embracing seven years, I examined and recorded particulars of 2401 cases of hernia. The entries included the name, age, sex, occupation, kind of rupture, the side affected, and the duration; whether and how long each had worn a truss, the probable cause, whether operated upon, and during the year 1870 the family history.

The age at which the hernia developed itself was ascertained as accurately as possible by reckoning back to the age at which the rupture was first noticed.

No case is counted twice during the seven years.

At Time first observed.

Age.	Sex.	Inguinal and scrotal.				Labial.	Inguino-scrotal.	Scroto-Total.	Femoral.				Femoro-inguinal.	Inguino-femoral.	Total.	Umbilical.	Ven-tral.	Gross total.
		Right.	Left.	Double.	Total.				Right.	Left.	Double.	Total.						
Under 1 year {	M.	189	44	78	311	..	..	1	..	..	..	..	..	..	..	28	..	340
	F.	8	2	24	124	..	..	..	1	..	..	1	..	..	..	17	..	304
1 to 5 {	M.	60	14	10½	84½	..	1	..	..	..	..	..	..	..	..	1	..	86½
	F.	4	5	3	12	..	..	..	..	..	..	2	..	..	..	1	..	15
6 " 10 {	M.	28	15	10½	53½	..	1	2	..	..	½	..	..	..	..	..	..	55½
	F.	5	3	8½	16½	..	..	..	..	..	..	..	..	..	..	2	..	11
11 " 15 {	M.	27	10	9	46	..	1½	2	..	1	1	4	..	..	..	..	..	48
	F.	3	1	..	4	..	..	..	2	..	..	..	..	..	..	..	..	8
16 " 20 {	M.	40	23	28½	91½	..	2	3	..	2	3½	2	..	..	..	..	..	96½
	F.	3	5	4	12	..	..	..	10	3	..	16½	..	..	..	1	..	29½
21 " 25 {	M.	66	41	33½	140½	..	2	2½	1	1	3½	2	..	..	..	..	..	145
	F.	10	7	3½	20½	..	..	..	13	2	..	18½	..	..	..	..	..	39
26 " 30 {	M.	62	50	46½	158½	..	1	1½	1	..	..	1	..	..	..	..	..	161
	F.	12	10	4½	26½	..	..	..	14	6	7	27	..	..	..	4	..	57½
31 " 35 {	M.	61	45	69	175	..	2	3½	4	..	1	5	..	..	..	1	..	185
	F.	2	6	5	13	1	..	1	13	6	3½	22½	..	..	..	10	..	46½

[illegible]

Frequency of hernia in the two sexes.

The gross total for all ages and every variety of hernia included 1990 males and 411 females. These numbers give a ratio of more than 4 males to 1 female, viz. 4·84, or a proportion per cent. of about 83 males to 17 females.

This result agrees closely with the numbers which Mr. Birkett quotes in his excellent article on hernia in Holmes's 'System of Surgery,' from Mr. Kingdon's statistics of the City of London Truss Society. The numbers referred to are—males, 78,394; females, 18,492; and they yield a ratio of 4·23 to 1.

Mr. Kingdon, however, in his "Causes of Hernia" ('Medico-Chirurgical Transactions,' vol. xlvii), states that the tables of the City of London Truss Society indicate a proportion of 5 males to 1 female; but he is disposed to mistrust these figures, as they were based on annual reports, and he writes that in an annual report the number of males (even though never counted a second time, of which there must always be some chance) will be unduly swelled in proportion to the other sex, for men wear out and apply for trusses more frequently than women. He thinks Cloquet's estimate is a fairer one, viz. 2 males to 1 female, the latter author's proportion being drawn from *dissections* of 457 cases of hernia. Thinking that hospital statistics of the subjects of strangulated hernia might be found to bear on this question, I examined the tables of St. Thomas's, St. Bartholomew's, and Guy's, with the following striking results:—At St. Thomas's the proportion of males to females operated on was 1·44 to 1; at St. Bartholomew's, 1·1 to 1; and at Guy's, 1·16 to 1. These tables, therefore, quite fail to support either Cloquet's, Kingdon's, or my estimate, though they show in a remarkable manner that females are only a little less liable to symptoms of strangulated hernia than the hardier sex. Probably the tables of truss societies, which embrace every age and kind of rupture, furnish better data on this question than the field whence Cloquet's figures were derived. The truth may lie between the two sets of proportions, viz. of 4·84 males to 1 female, and 1·23 males to 1 female, that is 3·033 to 1.

Frequency in relation to age.

It will be seen that of the total number of cases observed, viz. 2401, 1355 were under thirty-five years of age, and 1046 were over that age. From this it would appear at first that hernia is more frequent before thirty-five than after it, but when this subject is more carefully looked into the period of life after thirty-five, will be found relatively more liable to the occurrence of hernia than the earlier one. As pointed out by Mr. Kingdon and described by Mr. Birkett, the proper way to test the question, is to obtain the proportion between the number of cases under any particular age and the total number observed, and to compare that with the proportion between the number of the population living under the same age and the total population. According to the census for 1861, the total population of London, including all ages, and both sexes, was 2,803,989. Of these, 1,940,250 were under thirty-five years of age, and 863,739 were over thirty-five years of age. These figures yield a proportion per cent. of 69.1 and 30.8 respectively.

From this it is evident that the relative proportion per cent. of cases of hernia over thirty-five years of age is great compared with the number per cent. of the population living at the same period. When the comparison is carried out farther and the necessary calculation made, the greater frequency of hernia in the later periods of life becomes still more evident, the proportion running as follows :

Relative to the population under thirty-five the proportion per cent. of cases of hernia is 36.62, say 37, and relative to the population over thirty-five the proportion per cent. is 63.37, say 63.

Of the total number recorded, 472 were noted under five years of age. This is by far the largest number referred to any quinquennial period. This points to the first five years of life as the most prone to the development of hernia, and this seems confirmed by a comparison of the ratio between the number of cases of hernia recorded against the different quinquennial periods and the total number observed on the one hand, on the other hand with the ratio between the numbers of the population at similar ages and the total population according to the census quoted

above. Thus, the ratio between 2401, the total number of hernia cases observed, and 472, the total observed under five years of age, is 1 to 5.08; whilst the ratio between 2,803,989, the total population of London, and 362,296, the population under five years of age, is 1 to 7.7.

A great difference will be discovered between the ratios for the next period, viz. six to ten years of age. The number of cases referred to this period is 67, which, with the total of 2401, yields a ratio of 1 to 35.8. The number of the population for this period is 300,259, which, with the total number, gives a ratio of 1 to 9.3. This shows that the period of life from five to ten is much less prone to hernia than the earlier one.

The next quinquennial is even less exposed to the occurrence, yielding a ratio of 1 to 42 against a population ratio of 1 to 10.6. After this the ratios gradually become more equal.

On instituting a comparison between the proportion per cent. of cases of hernia under five years of age to the population under five and to the population of all ages over five, I find the proportion per cent. of cases of hernia under five to the population under five is 62, and relative to the population over five the proportion per cent. is 38.

This brings the proneness of infancy to hernia into yet stronger relief.

Frequency in relation to occupations.

The occupations of 1464 adults were noted and are stated below.

General labourers	483	Boot and shoemakers	31
Carpenters and joiners . . .	106	Excavators	30
Messengers, porters, and ware-		Cabmen, coachmen, and conductors	30
housemen	100	Domestic servants (males), ver-	
Carmen, draymen, ostlers, and		gers, and waiters	28
carriage cleaners	82	Coopers	26
Gardeners	47	Hawkers and costermongers . .	23
Blacksmiths and hammermen .	47	Commercial clerks and reporters	21
Farm labourers	40	Weavers	20
Painters, plasterers, and house		Cheesemongers	20
decorators	40	Barge and lightermen	20
Railway labourers, guards, and		Smiths (white, copper, brass) and	
porters	37	plumbers	19
Seamen	35	Sawyers	13
Bakers and confectioners . . .	31	Tailors	12

Hatters	12	Barbers	5
Wheelwrights, millwrights, and shipwrights	11	Shopkeepers	4
Masons and paviors	11	Musicians	4
Police	10	Schoolmasters	3
Pensioners	10	Butchers	2
Printers	8	Chinneysweeps	2
Publicans and potmen	7	Actor	1
Firemen	7	Engraver	1
Stationers	7	Glassblower	1
Brush finishers	6	Chiropodist	1
Postmen	5		
Military	5	Total	1464

A third of the total number was derived from the class of general labourers, including engineers, bricklayers, and wharf labourers, men employed in gas-works, breweries, tanneries, soap factories, and iron foundries, boiler makers, coalheavers, &c.

I cannot point to any one special occupation as eminently productive of ruptures. The numbers of the labouring classes, rather than the character of the toil or trade and labour are the causes to which we must turn to account for the multitude of applicants to the truss societies. Mr. Kingdon investigated this subject in 1861. He made a list from the census of 1851 of twenty-five of the largest classes of occupations, arranged them in the order of their magnitude, and compared with them the number of each class which applied to the City of London Truss Society during three successive years. In his Report of 1862 he writes that "The patients who seek relief on account of hernia bear a direct proportion to the numerical magnitude of the classes to which they respectively belong, and not to the severity of the toil."

The figures I have given tend to confirm that statement.

With reference to the influence of occupation on females, as might have been expected, those who are married are the most liable to the malady under review.

The condition in life of 275 females was recorded:—19 were children, 212 married or widows, 22 in service, 4 dressmakers, 4 laundresses, 1 was a bootbinder, 1 a teacher, 1 a Sister of Charity, 11 were described as of no occupation.

Hereditary predisposition.

The family history was only noted during the year 1870. Many applicants did not know whether their parents or other relatives had been the subjects of ruptures. That being the case, an estimate of the proportion per cent. of those who inherited a tendency to rupture would be unreliable.

Of the whole number seen in the year, 72 males stated that one or more relatives had been or were ruptured. Of this number—

17	stated that the father only was ruptured.
1	„ father and grandfather were ruptured.
4	„ grandfather only was ruptured.
1	„ great grandfather, grandfather, paternal and maternal uncles, were ruptured.
2	„ grandfather and uncle were ruptured.
1	„ „ son „
8	„ father and 1 brother „
1	„ „ and 3 brothers „
1	„ „ 5 brothers, 2 uncles, 1 son, and others, were ruptured.
1	„ „ 1 brother and sister were ruptured.
1	„ „ and sister were ruptured.
1	„ „ and 2 uncles „
1	„ „ and 1 uncle „
1	„ „ aunt, and cousin „
1	„ „ and cousin „
1	„ „ mother, and 1 sister „
13	„ 1 brother was ruptured.
1	„ 2 brothers were ruptured.
1	„ 3 „ „
1	„ 1 brother and 1 son were ruptured.
3	„ 1 uncle was ruptured.
2	„ 1 son „
1	„ 1 son and daughter were ruptured.
5	„ mother was ruptured.
2	„ maternal grandmother was ruptured.

Causes.

The cause assigned by or for the applicant was recorded in 1933 instances. In 141 the cause was doubtful, and in 327 cases no cause was mentioned or recorded. In 325 of the

1933 records the subject was stated to have been born ruptured, or to have been discovered so affected a few days after birth; 87 women, that is 21 per cent., attributed their condition to childbirth.

The causes in the remaining 1521 are arranged below, according to the numbers attributed to them. It is remarkable that so many as 734 should have been assigned to lifting or a similar muscular exertion.

Congenital	325	Pressure	12
Childbirth	87	Riding	9
Lifting	734	Twists	8
Falling	133	Jerks	8
Coughing, &c.	132	Washing and wringing	8
Straining	99	Climbing and going up stairs	7
Carrying	78	Retching	6
Slipping	59	Rowing	6
Blow on abdomen	46	Mowing	6
Jumping	30	Mangling	4
Pulling	28	Gun drill	3
Pushing	27	Calling and carrying	3
Accident	23	Gymnastics	2
Labour	14	Shake	1
False step	14	Standing	1
Walking, running, &c.	10	Doubtful	141
Overreaching	10	Not mentioned	327

Frequency of inguinal hernia.

Of the total, 2066 were of the above kind of rupture. That number, compared with the 335 remaining cases, bears a ratio of more than 6 to 1, or 6·1 to 1.

In relation to femoral hernia (only 229 cases), inguinal has a ratio of 9 to 1.

There were 1907 males against 159 females, and from these we obtain the result that there were twelve times more males affected with this species of rupture than females.

As regards the females, there were, within 30, as many the subject of inguinal as of femoral hernia.

The proportion between the numbers ruptured on the right and left sides was 1·76 to 1 respectively, but of those under one year of age there were four times as many ruptured on the right side as on the left, there being 197 on the right and 46

on the left; whilst for the adults between thirty-five and forty years of age the ratio was 1·26 to 1, the figures being 82 and 65 for the right and left sides respectively.

This tends to confirm the belief that the right tunica vaginalis remains open longer than the left, but only in the very early period of life.

The general impression that the right side in the adult is more liable to a hernia than the left appears at the same time erroneous.

Frequency of inguinal hernia in the female.

The general belief is that females are more liable to femoral than to inguinal rupture, but that belief is erroneous. The fact is that women are nearly as disposed to the one as to the other, as these figures show:—159 women were afflicted with inguinal hernia and 189 with the femoral variety, a difference of 30 only in favour of the latter kind.

The decennial period of twenty to thirty seems to be the one most exposed to the risks of the inguinal form. As many as 47 were recorded against this period, and 16 only in the period next below, viz. ten to twenty; but in the first ten years the number is high, 33 being noted in them. After thirty years of age the numbers begin steadily to decline. The very early period of life and the period at which women either enter service or marry are the times at which this form of rupture is most frequently developed in them.

Frequency of femoral hernia.

This form of hernia is more commonly met with amongst women than men; the proportion of the former to the latter was as 4·7 to 1, the numbers being 189 females to 40 males.

There is a great disproportion between the numbers of inguinal and femoral hernia seen at the early period of life up to five years of age. Femoral is very rare; only 3 cases were noted under the age specified. It was shown that up to the same age the inguinal description is common.

The numbers begin to be large after fifteen years of age, and increase up to the fortieth year, and after the forty-fifth decline, at first suddenly and then steadily.

The decennial most remarkable for the frequency of the species of hernia under review is that of thirty-five to forty-five, in which 60 cases were recorded. Of the quinquennial periods, that of thirty-five to forty exhibits the highest numbers.

The congenital condition does not predispose either sex to this form of rupture, whereas it renders both males and females, and especially the former, obnoxious to the inguinal kind.

The years of service and married life on the part of females are clearly the most exposed to this crural variety.

The right side is nearly twice as liable as the left to this rupture, the numbers being 117 for the right side and 61 for the left, including both sexes.

Under the head of inguinal hernia I have already pointed out that these figures assist to dispel the popular belief that women are much more commonly the subject of the femoral than of the other kind of protrusion.

Inguino-labial.

One case was seen. The inguinal rupture was on the right side and the labial on the left. The woman was between thirty and thirty-five years of age.

Labial.

Only one case was noted, between thirty-six and forty years of age.

Inguino-femoral.

Eleven cases were noted. Of these, 9 were males. In 6 men the right side exhibited an inguinal rupture and the left a femoral. In the remaining 3 the order was reversed. The 2 women followed the order of the minority of the men.

The ages at which these persons first discovered that they were ruptured varied from thirty to over seventy. The majority occurred between forty-five and fifty.

Ventral.

Two instances of this class of rupture were noted—one of

a man aged fifty-nine years, in whom the protrusion had formed on the outer side of the left rectus muscle; the other of a woman aged thirty-six years. In her case the yielding had taken place between the recti muscles, and had followed childbirth.

Umbilical.

Of this description of hernia 104 cases presented themselves—males 42 and females 62. Amongst the males two thirds were observed during the first year of life, and a little more than one fourth of the females were found to have been ruptured at the same period; thus, three sevenths, or nearly one half of the whole number, were affected during the first year of life or soon after birth. Next to this early period the span of life from forty-five to sixty of the males was the most productive of this form. In the lives of the females the decennial periods from twenty to fifty presented the greatest numbers. This rupture is rare between the first year and the twentieth, and becomes rare again after the fiftieth year.

Hydrocele.

In 19 cases scrotal or inguinal hernia was accompanied by a hydrocele, and one of these men had a hydrocele on each side.

Herniotomy.

I have recorded that 14 males underwent cutting operations for the relief of strangulation. One had been operated upon twice on the same (right) side.

Eighteen females had been submitted to operation.

CONTRIBUTION
TOWARDS THE
SURGICAL TREATMENT OF DISEASED
JOINTS.

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IN the present communication it is the author's intention to record the cases of joint excision (hip excepted) which have been under his care during the past year, limiting himself to those which have been completed. He has had numerous other joint cases, some remedied by rest, counter-irritation, and constitutional treatment, some requiring operations by trephine or otherwise; but these will form the subject of another paper. Figs. 1 and 2 are engravings of two knee excisions described in the previous volume of Hospital reports (Roffe and Woolley respectively). The drawings of these in the second volume were not good; and as these patients have been seen quite recently perfectly well and with good sound limbs, representations of their present condition are here given.

In this paper are included eleven fresh cases of knee-joint resection. Four of these belong to the typical cases referred to in the preceding volumes, where the mischief was dependent on the existence of a sequestrum or bone abscess in the neighbourhood of and irritating the joint. In two resection was performed for fibrous ankylosis and malposition of limb, some disease being also present. In the remaining five operative interference was had recourse to in order to get rid of progressive disease, to correct malposition, and to promote a more

rapid recovery. Besides these knee resections, two interesting cases are described—one of wrist, the other of ankle, excision.

The author has not yet deviated from the mode of operating previously described, by the front oval flap: the operation is easy of performance; by it a more thorough examination of the resected surfaces and a more complete removal of diseased structures seem possible than by any other mode of operating. At the same time he has a strong desire to adopt two lateral incisions, if a thorough performance of the operation by this mode could be matured. He has tried this plan on the dead subject and finds it easy of performance; and his friend Mr. Treves of Margate has carried it out on the living, making use of a chain saw to resect the bones. On the dead subject the author has found it not difficult to pass close behind the bones a narrow blade of Butcher's saw; this can be afterwards fixed, and resection done from behind forwards.

No other than a bony ankylosis was sought for; and by diligent attention to fixedness of limb not one failure has occurred in the attainment of this result. The importance of mobility is, of course, recognised, if this could be secured without risk of subsequent dislocation, which would seem predisposed to by the necessitated free division of ligaments. The excision splint previously described has been that always adopted (see Vol. I); nor has there been any reason to desire a change.

It seems a matter of no little importance to keep on the first dressings for twenty-four hours or more. Generally these dressings have been antiseptic. It has been attempted to continue this mode; in some instances with success, but in many the discharge has been so profuse, with a tendency to burrow rather than escape, that after a few days dressings were used which could be changed more frequently.

Several of the knee-joint resections have been in children; these seem to suffer less shock from the operation than adults. On the other hand, there seems a greater disposition in children for granulations to become profuse, to degenerate and assume a condition similar to what one finds in strumous disease of synovial membrane.

That the operation of excision is risky cannot for a moment be denied. Such operation is not to be loosely determined on. A compound fracture in the middle of

the shaft of a bone is no light matter, the treatment of such is not free from anxiety, and a successful result is a matter of congratulation; but how much greater must be the anxiety with prolonged suppuration occurring about the exposed cancellous ends. Every means should be adopted to limit this suppuration, to prevent putrefactive changes and the accumulation and burrowing of pus. The success of excisions depends much, *inter alia*, on the daily supervision of the surgeon; very little should be left to nurses except the most experienced; openings should be made without delay to get rid of any purulent collections. In not a few cases the author has found diarrhœa supervene in this suppurative stage, no doubt from systemic poisoning; this not to be remedied by astringents, but by quinine in large doses. It would not be desirable to arrest suddenly this elimination of poisonous material.

The shock of an excision (as in the knee) is frequently great; this and the subsequent discharge, often profuse, are important points to consider before undertaking an excision. It would require much consideration before having recourse to excision in a worn-out subject, with powers doubtful to sustain the shock or bear up against the suppuration which is likely to occur. In a given case to be doubtful as to the selection of amputation or excision is not a satisfactory condition. It is well not to let the patient descend to too low an ebb before resorting to a resection; with powers tolerably good he will probably do well; allowed to get lower, amputation would probably be the desirable proceeding. The author has recently had a good case illustrative of this. A boy with suppuration of the knee-joint after a glass wound was rapidly going to the bad; pus was profuse and burrowing in all directions, not to be arrested by free incisions; his strength was rapidly failing, but was still sufficient to lead one to anticipate a good result from excision. This was done and with marked relief to all his symptoms. Later on, with his strength further diminished, amputation would probably have been required. Before the occurrence of extreme exhaustion resection was selected and followed by a good result.

In the following pages cases are given with illustrations. Any points of interest in connexion with each case are likewise referred to.

CASE 1. — *Excision of the right knee for disease primarily synorial; old and recent synovial mischief; recent subchondral osteitis; dislocation.*

Mary Brophcy, æt. 7, was admitted into St. Thomas's Hospital, under the care of Mr. Sydney Jones, on September 9th, 1871. She had previously been under treatment for disease of the right knee, at the temporary hospital; and various means, local and constitutional, had been adopted for her relief. She had had prolonged rest and extension on splint; and the exterior of the joint had been repeatedly blistered and painted with iodine. The child looked well, but no progress was made with the joint. When left out of splint for awhile, the leg became drawn up and flexed on the thigh; and re-extension caused her considerable pain. There was dislocation backwards and outwards of the head of the tibia; there was extreme pain complained of on letting the heel fall a few inches on to the bed; she had no power to raise the leg, except with the hands. Much pain was complained of on pressing together tibia and femur; so also on pressing the patella against femur, as well as on each side of the patella. The least lateral movement caused such pain as to make the child, usually very good and quiet, cry most bitterly.

On the 15th of November Mr. Sydney Jones excised the joint. Before making the first incision the leg was bent at right angles to the thigh, and during this forced flexion adhesions were felt to yield. The femur and tibia were resected from behind forwards, about half an inch at its thickest part being removed from the femur, about one third of an inch from the tibia. The patella was also pared. Much fibrous ankylosis was cut through in exposing the bone surfaces. There was no pus; the synovial membrane was pulpy and gelatinous, especially about the patella and lateral ligaments.

Femur.—Inner condyle for the most part was covered with connective tissue adherent to cartilage, evidently either torn through during forced flexion or divided by the knife subsequently. The lower or back half of this condyle had some delicate filamentous tissue lying on it, and towards the inner margin presented several worm-eaten apertures, with red granulation tissue cropping out through these. A section made here showed granulations connected with bone sprouting up as processes through the cartilage. *Outer condyle.*—Corresponding with the situation of the patella there was a pinkish patch of cartilage about the area of a sixpence; and on making here a section through cartilage and bone, the former was quite detached and the subjacent bone rough but firm. Further back on this condyle there were several worm-eaten apertures leading to bone; here the cartilage was much thinned from the synovial surface and apparently overlaid by synovial prolongations (connective tissue easily detached), but was firmly adherent to bone. The sawn surface of femur was firm and vascular. The intercondyloid notch was occupied by synovial connective tissue and remnants of crucial ligaments.

Tibia.—The semilunar cartilages were altered and indistinguishable, or nearly so, being blended with synovial connective tissue. On the inner head of the tibia the cartilage was thinned and covered by now flocculent filamentous tissue. The cartilage on the outer head of the tibia had barely the area of a sixpence; what remained was covered posteriorly by synovial prolongations. Near the spine of

the tibia the bone was bare and rough. The cartilage all around the margin of the patella was thinned and overlapped by synovial processes; and, on raising these, pinhole perforations were seen, in some instances reaching the bone. The rest of the cartilage was pinkish, like that on the opposed surface of femur; and here, on section of bone and cartilage, the bone was found much congested, the cartilage loosened and readily detached.

In this case the mischief seems to have been primarily synovial; much repair had occurred in the direction of fibrous ankylosis, but the synovial membrane was still very vascular and gelatinous in places; also active disease (subarticular caries) was in progress between the bone and cartilage in the patella and on the corresponding surface of femur; and at other parts congestive changes were going on on the surface of the bone, granulations springing from this and causing erosions of cartilage which varied from minute pits to actual perforations.

The resection was done under carbolic spray, and the antiseptic gauze subsequently used. There was much rigidity about the hamstrings, so that it was necessary to get the patient thoroughly under the influence of chloroform in order to get the limb in a straight position. The usual splint was applied.

November 16th.—Has had a good deal of pain from jumping of limb; tongue is moist; and she has taken food well. The temperature, which, previous to operation, was 98.8° and immediately after 97.8° , is this morning 100.4° , in the evening 101.2° .

For the next few days this pain and jumping continued, doubtless from the close approximation of the sawn surfaces and the spasm of the hamstrings. The pulse, however, was quiet, and the temperature kept at about 100° .

On the 22nd the leg was much easier; external wound looked very well, healed throughout except at angles, from the outer of which there is much discharge; alternate sutures still remaining.

27th.—Has been at times very restless, with pain in the knee. Some trouble with the heel had also to be removed by snipping of the bandages. Tongue keeps clean; wound looks well; the remaining sutures removed to-day.

December 2nd.—Has been much better, and has taken food well. Some apparent tendency to rotation outwards of the femur was corrected by the use of sand bag placed beneath the trochanter major.

13th.—There is a red spot over the patella, and threatening suppuration in that direction.

20th.—An abscess was opened over the patella; and a more free opening was made at the outer angle of the original wound.

January 1st.—Very much improved. The girl looks well; the swelling has subsided; wound nearly healed; and the limb in very good position.

25th (ten weeks after excision).—The splint was removed. Union was good, but not quite firm. A leathern splint was applied. Length very good; a few sinuses alone remained.

13th.—She began to complain of some tenderness in the popliteal region, apparently dependent on a sinus passing in that direction between the femur and

tibia. Very often this pain was absent for a week or more, and would then recur. There was, on recurrence of pain, a tender spot to be detected on deep pressure in the ham; not fluctuating, however, so that one was satisfied with rest and the use of a light compress posteriorly. She was kept quiet until the 2nd of April, when she was allowed to move about the ward with crutches. Her home was a poor one, and the girl herself delicate, so that she was kept under supervision in the hospital until June 26th, when she was sent to Margate, a sinus still existing on the outer side. She was seen recently, repair was complete, and she could walk well and firmly. (See Plate III, fig. 5.)

CASE 2.—*Disease of right knee; old and recent synovial mischief; suppuration; subchondral osteitis; resection.*

Maria Harrington, æt. 6, was admitted into St. Thomas's Hospital under the care of Mr. Sydney Jones, on the 13th of November, 1871. She had had disease of the right knee for over two years, and during this time she had been subjected to a variety of treatment, local and constitutional. The leg was flexed at about a right angle with the thigh, and any movement gave considerable pain. There was a very boggy sensation about various parts of the joint; especially above the patella, and about the situation of the external lateral ligament. Knocking the joint surfaces together gave pain, so did pressure on the under surface of the condyles. Firm pressure of the patella gave much pain. The condyles of the femur seemed enlarged, and the head of the tibia less so. Syrup of iodide of iron was ordered, with cod liver oil. The limb was put on a Liston splint, and attempts made to straighten it by gradually increased pressure by means of a patella pad. But this pressure was ill borne, and one made but little way in correcting the position of the limb. The patient was irritable, not tolerant of pain, and her nights were especially restless.

On the 6th of December Mr. Sydney Jones excised the joint. Pus was found in the synovial pouch above the patella, and a drachm or so of purulent lymph escaped from the outer side near the external lateral ligament. There was much thickening of the ligamentum mucosum; and much connective tissue, in the neighbourhood of the crucial ligaments, passed between the femur and tibia. The section of the femur varied from half to three quarters of an inch in thickness. Synovial prolongations overlapped the external condyle; and similar material, continuous with membrane covering the crucial ligaments, passed in front of the internal condyle and overlapped the margin of its inferior surface. The cartilage of the outer condyle presented, just below the patellar articular surface, from fifteen to twenty worm-eaten apertures, which varied in size from a fine point to a large pin's head. Each worm-eaten spot was filled with granulation material, and allowed a probe to be passed to bone. The cartilage here was certainly thinned from the synovial surface. Also in many places the cartilage was detached from the subjacent bone; in some of these excavations merely, filled with granulations from bone, were found on the deeper surface of the cartilage; in others the cartilage was perforated to the joint surface. Three or four similar pinhole perforations leading to bone existed on the inner side of the inner condyle, where covered by synovial processes.

The *patella* had its margin overlapped. A section of bone and cartilage showed

an extraordinarily well-marked line of vascularity of the former immediately beneath the cartilage, and in some few places the latter was detached. There was not that intimate connection between bone and cartilage which existed elsewhere; a blunt edge might be passed between the cartilage and bone, the interval being occupied by granulation material.

Tibia.—The semilunar cartilages might be traced more or less distinctly, but their external margins were fused with hypertrophied connective tissue; and a membranous structure continuous with synovial membrane could be traced over the cartilage on the inner and outer heads of the tibia.

On section of the inner head of the tibia the cartilage towards the front was found thinned, from one to two lines, from the synovial surface; this part showed four or five pinhole perforations. The section here showed two distinct kinds of cartilage: that directly over bone, of variable thickness, no doubt ossifying cartilages; and over this there was a layer of uniform thickness, the proper cartilage of the joint; this layer of uniform thickness was much whiter than the deeper cartilage, which had a pinkish and darker hue. The sawn surface of tibia had the bony tissue tolerably firm, though in most places capable of indentation by the finger-nail; but in some places only fat remained, with spicula of bone interspersed.

The wound was dressed with lint dipped in carbolized oil; and the parts were accurately adjusted on the usual excision splint.

On the 7th of December had a very good night, doing very well; temperature 100·8°.

8th.—Two sutures removed, one from each angle. Temperature 100°.

9th.—Temperature 100·2°. Not complaining of any pain.

15th.—Has been doing very well; had a good night, but this morning is complaining of some jumping of limb; the sutures have all been removed.

21st.—Wound quite healed on the inner side, but still discharging from outer angle and from the centre. She continued to progress very satisfactorily. The splint was changed for the first time, as customary, at the sixth week. Union was then progressing well, but not firm; replaced in splint.

February 3rd.—Wound healed, except at outer angle; appetite good; sleeps well; no pain; is anæmic, is taking Vinum Ferri ʒij, with Ol. Morrhuæ ʒij, b. d., and ʒij of wine.

March 4th.—Wound quite healed; union firm; can move the leg without any pain. The excision splint discontinued and a moulded leather splint applied.

She was kept under supervision at the hospital until June 30th, when she left quite well, with a good firm leg; able to walk well and firmly. (See Plate III, fig. 6.)

Here was a case where one would diagnose the starting of mischief as synovial: there was evidence of this by the synovial prolongations to be traced over the condyles and margin of patella, and from the connective tissue developed about the crucial ligaments and semilunar cartilages. The articular cartilages had been thinned from the synovial surface; but in many places there was evidence of the mischief being participated in by the bone, doubtless for repair. Granulations were proceeding from the bone surface through the cartilage;

these ultimately would have fused with synovial granulations, to result in ankylosis. The congestion so well marked, and the line of separation between bone and cartilage of patella, accounted for the pain complained of on pressure in that situation.

CASE 3.

The following case was one of great interest, in that at the time of resection the cancellous tissue, especially of the tibia, was so atrophied, soft, and fatty as to break down on the least pressure with the finger, and raise a reasonable doubt as to the possibility of repair; and yet in this case progress went on uninterruptedly well. The exterior wound healed almost entirely by first intention; there was no burrowing of pus, in fact barely any suppuration; and union of the bone surfaces became perfectly firm, and that too at an early date.

Jane Gardner, æt. 13, was admitted into St. Thomas's Hospital, under Mr. Sydney Jones, on the 5th of October, 1871.

Two years previously her left knee began to swell without any apparent cause. Though there was swelling, she did not suffer much pain at first, and continued walking for three months. Then, on account of so-called weakness of the joint, she was unable to walk, and had to keep her leg more or less in a horizontal position. It had since been getting gradually worse. During the last two months she had suffered a great deal of pain, more especially in the neighbourhood of the patella. On admission the knee was flexed almost at a right angle, and any attempt to straighten the limb caused much suffering. There was dislocation slightly backwards and outwards of the tibia. There was much pain on pressing the femur and tibia together, and also in pressing the patella against femur. There did not seem to be any enlargement of the tibia. The inner condyle of the femur was especially prominent; here a boggy sensation was experienced on manipulation. She evidently suffered much, and her nights were very restless. Her general health, however, kept pretty good. Extension, very gradual, was attempted, but gave her very great pain and did not have any material influence over the position.

On the 18th of October excision was performed by Mr. Sydney Jones. There was much lymph in the interior of the joint, as well as lining and adherent to the inner surface of the capsule, especially over the internal condyle.

The slice removed from the femur varied in thickness from half to three quarters of an inch. There was much lymph and false membrane covering the articular surface, easily removed with the finger. From the internal condyle the greater part of the cartilage had disappeared, except above, and around margin. The under surface of this condyle was covered by some delicate connective tissue adherent to the subjacent bone, prolonged from the synovial membrane, and overlapping the rounded-off margin of the cartilage which remained. The cartilage of the trochlear surface was all detached except in the

middle of the groove; the deep surface was eroded and rested upon granulations from bone. This part of the cartilage was pinkish on joint surface, especially at its lower part; and here it was covered by a delicate adherent filamentous tissue.

Outer condyle.—The front part was almost deprived of cartilage, except just at the outer margin, where there was an irregular bridge about half an inch long, and one to three lines broad, with sinuous margin, connecting the trochlear piece of cartilage above described with the cartilage at the back and under part of this condyle. This bridge was detached, and nearly the whole front part of this condyle was irregular from caries. The posterior half of this condyle had its cartilage quite detached and eroded on its under surface. The bone surface was rough and covered with vascular granulations.

About the tibia there was much synovial prolongation. On the inner head there was not a trace of cartilage remaining, the bone surface was uneven and covered with soft granulation tissue continuous with synovial membrane. Upon the outer head there were lying two pieces of cartilage occupying nearly the area of this articular surface; they were for the most part quite detached, but in places adherent to subjacent granulations. The cartilage covering the patella was broken up into a number of fragments, eroded on their deep surface, some of them quite detached, others adherent to subjacent granulations.

On resecting the tibia the cancellous tissue was found very much atrophied; it was infiltrated with fat, seemed ill-supplied with blood, and was easily broken down on very slight pressure with the finger. It looked ill-adapted (and doubts were expressed in that direction) for throwing out reparative material. Not only was the articular surface of the patella removed, but also the lower edge of this bone, as it projected very low in the flap. The parts were accurately brought together and the limb secured on the excision splint.

19th.—Was sick after the operation. Did not get much sleep until the morning. Pulse 125; temperature 99.2°. Says she feels pretty well.

20th.—Is feeling and looking well, wound very satisfactory; a suture removed from either angle. Temperature 100°; pulse 130°.

21st.—Doing very well indeed. The girl still looks well, and has suffered but very little, if any, shock from the operation. Is complaining of pain in the heel, the padding of the splint not being quite perfect. Temperature 98.5°; pulse 128.

26th.—Seems quite cheerful, and is suffering no pain nor inconvenience. Wound still well, and has united throughout the greater part.

31st.—But very little discharge, and that only from the angles; other parts of the wound firmly united. General condition excellent.

November 11th.—Wound wholly united, and apparently there is in progress good consolidation of deeper parts.

December 1st.—Limb taken out of splint. Union not quite firm. A moulded leathern splint ordered to take the place of the ordinary excision splint.

She was soon allowed to walk about the ward with crutches. For security sake and to keep her under observation she was kept in the hospital until the 2nd of February. Union was then quite firm, and she walked well.

The surgeon, Dr. Carless, of Stroud, who sent the case to the hospital, and has been good enough to watch it since, writes recently that "the cure is complete and perfect, she walks well and with ease, has had no pain nor inconvenience; she is in good health." (See Plate IV, fig. 7.)

In the above case it would seem that the starting mischief of the joint was synovial, subsequently leading to progressive destruction of cartilage and surface of bone. Recent accession of acute inflammation had no doubt induced the formation of the lymph and false membrane found in the joint, and disposed to the necrosis and loosening of whatever cartilage remained.

The result, if no operative interference had occurred, would have been ankylosis; but after much time, suffering, and possibly other mishaps—least amongst these perhaps a faulty position of the limb.

In this case it must be conceded that much time and suffering were saved by the operation of excision.

CASE 4.—Resection of knee; necrosis of tibia; old and recent synovial disease; thinning and necrosis of cartilages.

James Cox, æt. 3½, a healthy looking boy, was admitted into St. Thomas's Hospital, under the care of Mr. Sydney Jones, on December 30th, 1871. He had been previously treated by Dr. Hooper, of Wandsworth.

His mother stated that two years previously the right knee began to swell. Although the boy limped, he did not seem to suffer much at first. The swelling, however, increased; and pain was first seriously complained of about six months before admission, when wounds began to form about the knee.

On admission there were two or three freely discharging sinuses, one in the inner head of the tibia leading to a sequestrum. The joint was very much enlarged. On approximating the bone surfaces pus was made to exude from the sequestral aperture in the head of the tibia. The least movement gave much pain, especially on the inner side. A certain amount of fibrous ankylosis seemed to have occurred. There was much pain at night, depriving the patient of sleep. On his admission the limb was securely fixed on a splint, openings were made free, and fomentations applied. For some ten days after he was very restless, especially at night, when there was occasional delirium; his face was more or less flushed, and there was some patchy redness over the chest. There was also some soreness of throat which showed slight redness. The tongue, however, was clean. Pulse 144. One was inclined to look upon his symptoms as referable to irritative fever.

On the 16th of January he was better, and looked tolerably bright and well. The knee, however, was much swollen, and very painful; the sinuses discharged freely; the pulse was quick and feeble.

On the 24th Mr. Sydney Jones made an exploratory incision. A sequestrum, about the size of a Spanish nut, was removed by enlarging the sinus over the inner head of the tibia; a director passing freely through the opening thus made into the interior of the joint, it was thought advisable to proceed further, and, by laying open the joint by the oval resection flap, remove all the tissues involved in the disease. This was done, and thin slices taken from the femur, tibia, and

patella. The carbolic spray was used during the operation, and subsequently the antiseptic dressing was applied. There was pus and lymph in the interior of the joint. The synovial membrane showed evidence of past disease by increased development of connective tissue; but in places was red, swollen, and œdematous, in places ulcerated. In some parts the cartilage remained: where free, it had a cloudy appearance; where covered by synovial prolongation, it was thinned. In other parts this structure was necrosed and easily peeled off. The bone tissue was firm and vascular. A tolerably large gap was left in the tibia after removal of the sequestrum and adjacent tissue.

The bones having been accurately adjusted and sutures applied, the limb was securely fixed on the usual excision splint.

25th (day after operation).—Temperature 100·6°. Seems much relieved by the operation, the sister of the ward saying that he slept better last night than on any night since admission. Tongue clean; face slightly flushed.

27th.—Temperature 101·2°. Very quiet and composed; sleeps well.

29th.—Temperature 100·4°. Sutures removed, and some clean bandages applied.

February 3rd.—Did not look quite so bright, and for the next four or five days had some diarrhœa, for which Conf. Aromat. and Tr. of Catechu was ordered. Tongue kept clean, and temperature varied from 97·8° to 100°. The carbolic dressing was discontinued, there being very profuse discharge which necessitated dressing more frequently than once in twenty-four hours.

11th.—Looks all right again. Diarrhœa stopped.

16th.—Getting on fairly. The knee is much swollen.

26th.—Has been unwell the last few days, having been sick once or twice a day. Temperature 100° to 100·5°.

28th.—There has been threatening accumulation of pus on the inner side. This was evacuated to-day.

29th.—Pulse 120; temperature 99·6°. The sickness has ceased. Tongue clean. Patient much improved. Swelling of knee diminished.

March 29th.—There was still much swelling about the knee. The granulations were exuberant and flabby; and the line of cicatrix presented an œdematous appearance. It was thought that the circular pressure of the thigh bandage might have something to do with this condition. The splint was therefore discontinued, and the limb secured between sand-bags; at the same time the dressings were so applied as to exert some pressure over the swollen knee. Union of the resected surfaces seemed firm. Under the above treatment matters greatly improved; one sinus, however, remained for some time unhealed. He left the hospital with a good limb. Was seen in September and October; the wounds were healed; he walked well, quickly, and firmly, and with hardly any halt. (See Plate IV, fig. 8.)

In this case some probably would have advocated the simple removal of the sequestrum, and the making of free incisions for the escape of joint-débris. There would have been much necrosed cartilage and other sloughs to be removed; and many mishaps might have occurred during the process of cure. The result, if successful, would have been ankylosis. By the pro-

cedure adopted (removal of sequestrum and resection), the author is of opinion that much suffering was saved, possible exhaustion by profuse discharge was averted, and repair was effected more rapidly. Very thin slices only were taken from the femur and tibia, so as to remove simply the articular surfaces and not encroach upon the neighbourhood of the junction of epiphyses. There was during the healing process a tendency for the granulations to become exuberant and flabby; a condition observed not unfrequently in strumous children, especially when the disease originated in synovial membrane. The granulation seemed to have a tendency to degenerate, rather than develop into connective cicatricial tissue. When there was no evidence of pus being confined, pressure by many-tailed bandage, combined with some stimulating or astringent lotion, proved very efficient in restoring parts to a healthy condition.

CASE 5.

In the following case resection was had recourse to, not so much for arresting disease as to remedy deformity; and there seemed no other mode but that adopted to restore a useful condition of limb. (See Plate II, fig. 3.)

Edward Bottomly, a healthy looking boy, *æt.* 6, was admitted into St. Thomas's Hospital under the care of Mr. Sydney Jones, on the 7th December, 1871. The mother stated that the boy had had knee-joint disease for two years: that this did not follow any illness or injury: that he had at times complained severely of pain, especially at night; that the joint had been liable to become inflamed and the subject of much throbbing pain. He had been in a provincial hospital, and amputation had been there proposed. The knee was flexed (see Plate II, fig. 3) nearly at a right angle, and the tibia dislocated slightly backwards. The tibia was much atrophied, and was somewhat (one third of an inch) shorter than the opposite one. There seemed to be firm fibrous ankylosis; movement was very limited, only through an arc of about 10° ; this did not seem to cause any pain. There was tenderness on firm pressure over the external lateral ligament, over patella, and over under surface of femur on the outer side.

Resection was done on December 20th. Much fibrous ankylosis was cut through. The femur and tibia were sliced from behind forwards; there was much tension of hamstrings, rendering it necessary to remove a little more from the two bones before they could be brought into apposition. The patella was first sliced, but, as it projected in a somewhat unsightly manner, it was nearly all removed, a nucleus of bone and cartilage being allowed to remain at the upper

part. The wound was mopped out with spirits of wine and water (in equal proportions). The limb was then placed upon the usual splint, which had been carefully padded to prevent any falling back of the tibia. All parts came together very well. The antiseptic treatment was had recourse to throughout. The whole under surface of the internal condyle was covered with very firm, closely adherent connective tissue, extending in front to groove between the two condyles, and to the intercondyloid notch. In the latter situation this was very abundant, and mixed with fatty tissue. A band of connective tissue passed from the intercondyloid notch to the outer side of the outer condyle, crossing the back part of the under surface, not adherent, however, to the subjacent cartilage. The external condyle, for about one third of an inch near its border, had its cartilage thinned from the synovial surface; a sinuous outline, presenting two or three circular apertures, separating this depressed part from the rest of the cartilage. The inner half of the cartilage covering the external condyle was overlapped by synovial prolongations, and presented numerous apertures through the cartilage, occupied by granulations. Towards the back part of the inferior surface there was a furrow extending one third of an inch deep; here the cartilage was destroyed, and the bone forming the floor was soft and yielded pus. The cartilage in the neighbourhood of this was soft and undermined. A section through the outer condyle showed in some places thinning of the cartilage from the deep surface; in others the cartilage was quite perforated, and granulations cropped through from the bone.

A section of the inner condyle showed the connective tissue above described to be continuous with subjacent cartilage.

Tibia.—The semilunar cartilages were indistinguishable, being fused with adventitious tissue. Thin synovial prolongations were to be traced for a variable distance over the inner and outer heads of tibia, becoming merged into the tissue of the cartilage. Towards the front of the inner head of the tibia there were five or six bluish spots, each about the size of a pin's head, where cartilage was undermined but not perforated.

Patella.—All around the margin was hypertrophied synovial membrane, and the cartilage overlapped by this was thinned.

December 21st.—The child has passed a fair night, and does not complain much of pain, except a jumping of the limb. There has been some oozing during the night, and also slightly since nine o'clock. Pulse 120; temperature $101^{\circ}2'$. Tongue slightly coated.

22nd.—The limb jumping a good deal. Three minims of Tr. Opii were given, after which he slept well. The wound looks well; the oozing has entirely ceased. Two sutures were removed, one from either angle. Temperature $101^{\circ}2'$; pulse not so quick; tongue cleaner.

January 2nd.—The three remaining sutures were removed to-day. There is some slight gaping of the wound, and slight tendency to rotation of the thigh outwards. The temperature on the 26th dropped to $99^{\circ}6'$; and between that date and the present has varied from $99^{\circ}7'$ to $99^{\circ}2'$.

5th.—Wound looking much more healthy, and not so much space between its edges. During the last three days a carbolic bandage has been applied over the knee to bring the edges together in place of plaster, which seemed to irritate.

9th.—The tendency to rotation outwards of the thigh has been entirely obviated

by means of a pad under the trochanter major. The limb looks in good position. The boy complains of no pain.

13th.—The wound looking very well; three spots remaining ununited. There is very little discharge.

16th.—He has complained of much pain in the night, and the outer angle of the wound is swollen.

20th.—The cicatrix has yielded on the outer side, and there is a considerable amount of discharge.

30th.—The discharge is less, and the wound looks decidedly better. The outer portion is not healed, and the pus discharging from it seems to come from beneath the patella. The carbolic bandage to be applied firmly over the knee.

February 20th.—The splint was removed for the first time. Union was pretty good, but not firm. This was explained by the large amount of connective tissue which was seen posteriorly at the time of resection. It was difficult then to prevent this interposing itself between the bones.

March 2nd.—Position good. No pain. Child takes food well, and has gained flesh since operation.

21st.—Limb taken out of the splint again and examined. Union much firmer, but still yielding somewhat. The splint was kept on for another month, and at the end of that time a moulded leathern case was applied. From two sinuses, one in front, the other on the outer side, there was discharge, more or less, for a considerable time.

The boy was kept in the hospital until September 20th, 1872; but long before that his sinuses were healed, and union was firm. He used to walk about the ward without pain and with but little deformity of gait. He was kept long in hospital (living in Lincolnshire) in order to have him under observation. Between the left leg and that which had been subjected to resection there was seven eighths of an inch difference in length. (See Plate II, fig. 4.)

The notes of the above case after resection were carefully taken by Mr. Montague Palmer, to whose diligent care much of the successful result is due.

CASE 6.—Long-standing dislocation of patella; disorganization of joint; faulty position and uselessness of limb; sinus leading to bone.

Mary Ann Gearing, æt. 29, widow, was admitted into St. Thomas's Hospital, under the care of Mr. Sydney Jones, on March 6th, 1872. She had had two children; both died at an early age—one at five weeks, the other at five months; neither had any eruption, nor was one able to trace in the woman herself any previous history of syphilis.

She stated that fifteen months previously she had fallen down, striking her knee against the edge of the stairs. She was laid up for five months with much pain and swelling, and inability to use the limb. After three months she tried to use it, and an abscess formed soon after in front of the joint. This abscess discharged for some while, and a small sinus remained at the time of admission.

Evidently at the time of her accident the patella had been dislocated; and no

attempt had been made at reduction. The bone was on the outer surface of the outer condyle, with the inner border directed forward; it was only very slightly movable. The knee was flexed at an obtuse angle; could be flexed somewhat more, but could not be extended. Every attempt at movement of the joint was painful. The sinus in front of the joint allowed a probe to pass to bare bone on the trochlear surface of femur, also to bare and rough bone on the under surface of the displaced patella. Pressure on the trochlear surface of the femur caused great pain. The woman seemed in very good health, but her limb was useless, and she begged for something to be done.

On the 13th of March the knee was excised. Much fibrous ankylosis had to be cut through in order to expose the bone surfaces. The femur and tibia were resected, and the patella removed altogether. The latter bone was firmly fixed on its new situation and required much dissecting out; and, from the oblique course assumed by the parts connected with the upper border, it was found impossible to make it retain the median line of the limb. On the deep surface of the patella, near the outer border, there was a patch of rough, bare, but firm bone, about the area of a fourpenny piece. It was this bare bone which was felt by a probe passed along the sinus in front of the joint. The rest of the surface of the patella was covered by a thick firmly adherent layer of fibrous tissue which had taken the place of the articular cartilage.

Femur.—The surface of the two condyles was covered with adherent connective tissue, which had for the most part taken the place of the cartilage. The intercondyloid notch was filled with an abundance of similar material. The posterior part of the internal condyle was nodulated, apparently from new bony development; and towards the front part there was a small patch where the bone was bare. Some cartilage, about the area of a sixpence, apparently of normal thickness, still remained between the two condyles, immediately behind the trochlear surface. The part of the trochlear surface corresponding to the internal condyle was covered with firmly adherent connective tissue; that part belonging to the outer condyle was bare, but dense and smooth, and looked like the surface of a cranial bone which had been the subject of periostitis.

Tibia.—The inner head had had its surface irregularly destroyed, so that it was hillocky; but there did not seem any caries in progress. This surface was covered with closely adherent fibro-cartilaginous material. Some cartilage remained at the front part of the outer head; but the rest of this surface, except a small patch posteriorly where the bone was bare, was covered with dense fibrous tissue. Very slight hæmorrhage occurred during the operation. Parts were accurately adapted and securely fixed.

March 14th.—Has been incessantly sick since the operation. Temperature in morning $102^{\circ}2'$, at 10.30 p.m. $102^{\circ}5'$. Four minims of dilute hydrocyanic acid with five minims of Vin. Opii ordered every four hours.

15th.—Still very sick, the stomach rejecting everything. Half quantity of medicine to be taken every two hours. Has had considerable pain in the knee. Slept but very little. Face flushed. Pulse quick. Temperature in morning $100^{\circ}8'$, at 10 p.m. $102^{\circ}2'$.

16th.—Last night, under the influence of Liq. Opii sed mxxx in a teaspoonful of water, she slept pretty well; and to-day has had less sickness. Temperature in morning $101^{\circ}8'$, at night $102^{\circ}2'$. She was seen by Dr. Clapton, who ordered

Bismuth Subnit. gr. v, Sodæ Bicarb. gr. v, Acid. Hydrocy. dil. mij, Mucil. Acaciæ ʒss, Aq. ad ʒss, 4tis horis.

17th.—Slept again pretty well, from repetition of opiate draught. Has been sick twice since midday yesterday. The wound, which has shown very little action, this morning has an erysipelatous blush on the outer side of the knee. Tongue coated. One minim of croton oil ordered. Temperature, morning 101·7°, evening 102·8°.

18th (midday).—Not sick since last night. Is taking champagne, ice, and brandy. Redness has not extended much. Wound still unhealthy and sluggish. Temperature from 100·5° to 103·5°.

19th.—Sickness not quite ceased. Complains of headache. Temperature from 101·1° to 103·2°.

22nd.—Sickness still, but can take some food. Erysipelas has spread to the groin. Opening made at the outer angle of the wound. Pulse small and thrilling, 128; temperature from 100·8° to 102·4°. Aspect anxious; complexion muddy.

23rd.—Erysipelas has extended considerably, reaching over the abdomen and buttock. From this time she gradually sank, lying in a semi-conscious state for nearly a couple of days before her death, which occurred early on the morning of the 27th. Since the 22nd her temperatures had been—

March 23rd,	morning	101·2°	;	9.40 p.m.	100·6°.
„	24th	„	—	10	„ 101·4°.
„	25th	„	101·8°	;	9.20 „ 102·8°.
„	26th	„	101·2°.		

The following are Dr. Payne's notes of the post-mortem examination made by him on the 28th of March:

The ends of the sawn bones were covered with a layer of firm white inflammatory lymph without any granulations. Some pus burrowing among the muscles around. Flaps of skin sloughing away without any appearance of renewal. Otherwise wound not unhealthy and not offensive.

Below knee on inner side of leg was a sloughing patch where skin was perforated for a small space by deep ulcer a quarter of an inch broad. Similar more extensive patches of slough on upper and outer part of thigh, where skin was abruptly and entirely destroyed, epidermis being detached over still larger area. No deep suppuration under the skin.

Veins (femoral, iliac and cava).—Natural.

Pleura.—No fluid or adhesions.

Lungs.—Edematous; fairly full of blood; lower lobes congested, especially the left, which was dense and streaming with blood, but not consolidated, and did not sink in water.

Pericardium.—Natural.

Heart.—Moderate size; quite natural.

Liver.—Smooth; moderate size, substance natural.

Spleen.—Rather large; substance soft, rather pale red. A thick, yellow fibroid patch in capsule, looking like cartilage, about one to one and a half inch, distinctly in capsule, but appearing to encroach upon spleen substance.

Kidneys.—Unequal in size. One decidedly small, very thin and flat. Capsule adherent; surface rough and granular, but uniform in colour, looking like general wasting rather than the ordinary form of granular degeneration. The other larger, generally with the same appearance. The cortex of both decidedly wasted.

Brain.—Membranes, especially pia mater, generally injected, but not inflamed. Brain substance firm and natural. Choroid plexus rather pale. Uterus and ovaries generally natural; but an oval raised patch about a quarter of an inch long on os uteri, which appeared to be epithelium, and resembled a mucous patch.

In this case, on examination of the parts during and after resection it was evident that repair by fibrous ankylosis had occurred, except on the under surface of the patella, where bone was still bare and rough, and perhaps also on the trochlear surface of femur where bone was uncovered. A probe passed to these points. A patch of tibia was also bare. It is possible, and even probable, that fibrous material would subsequently have covered these bare patches, and that the existing sinus would, sooner or later, have healed. But, even if perfect repair had occurred, the position of the limb would have been faulty, so faulty as to preclude walking on the toe, or the wearing of any apparatus to make the limb useful. It seemed that operative interference was called for; and it was open to do one of three operations:

1st. To try and replace, by division of tendons and adhesions, the patella.

2nd. To remove altogether the patella.

3rd. To have recourse to resection.

It was impossible to say how far fibrous ankylosis had progressed. The pain on movement, and the detection of two bare patches, seemed to indicate no small amount of joint surface remaining, as well as bone mischief of which one did not know the extent. It would have been impossible to replace the patella; and the success which had followed such operations was not by any means encouraging. To have extirpated the patella alone would probably have led to extensive suppuration, and have left bare bone behind. Moreover, one could not have restored the tibia to a line with the femur. Excision seemed to be the only proceeding likely to lead to a successful result. This was done; but the patient never recovered from the shock; sickness was persistent; no action took place in the wound; and erysipelas terminated the case. No doubt the state of her kidneys disposed to the vomiting, and led to the

fatal result. The urine was not examined; but there did not seem any indication for such examination. This case, however, has confirmed the author's conviction of the necessity, before undertaking operations of importance, especially those of expediency, of always submitting the urine to careful examination. Some suspicious-looking scars, the thickened patch of spleen-capsule, and the mucous patch on the os uteri, made it possible that she had been the subject of syphilis.

According to the author's experience, from observation of several other cases, it would seem that much more serious consequences are apt to follow an operation (resection or removal of wedge), having for its object solely the correction of a faulty position of limb, the result of ankylosis, than a resection intended to get rid of disease in progress. This might have been expected. By the operation for ankylosis, where repair of mischief has long been completed, a formidable damage is inflicted on a system now quiescent and freed from the irritation existing before ankylosis. Shock after such interference is usually great; if recovered from, is frequently followed by violent reaction. In the case of resection for disease, the operation is done on one suffering more or less severely; and by the operation, the source of irritation is got rid of. In some instances, where the mischief and suffering have been great, relief by resection has been marked and immediate. It would seem (leaving out of consideration acute cases) that, *cæteris paribus*, the shock from the operation of resection is in an inverse proportion to the pain suffered and amount of mischief present.

CASE 7.—*Disease of left knee for four years; recurring attacks of pain and inflammation; necrosis of tibia; resection.*

James Reid, æt. 32, shoemaker, was admitted into St. Thomas's Hospital, under the care of Mr. Sydney Jones, on the 12th of February, 1872. Was sent into hospital by Dr. Macaulay, of Hatfield Broad Oak. He was thin and anæmic, but his general health was good; habits temperate. He stated that, four years previously, he noticed a swelling, not pulsating, in the left ham; he was then somewhat lame. Shortly afterwards the knee began to swell, especially on the inner side, and continued to increase; although he was able to get about, he did so with pain. About six months afterwards the ham swelling diminished, and subsequently disappeared entirely. Three years ago he went into one of the

metropolitan hospitals, and was for some months under treatment; he was then kept in bed on a splint; and iodine, blisters, actual cautery, were applied. Whilst there he had an attack of rheumatic fever, which, however, did not affect the left knee. He has on other occasions been under rational treatment, at one time remaining at perfect rest for six months, but without permanent benefit. His leg, at all times weak, was liable to recurring attacks of pain and inflammation. He had been the subject of much jumping pain in the limb. The pain complained of has been recently referred especially to the front and inner side; until two months before admission he had pain more marked on the outer side. On admission the knee could be bent almost to a right angle, but with pain; he could not rest his foot on the ground, so as to bear a small proportion of the weight of his body (and had been unable to do so for three or four months); and when in bed, in order to raise the leg, he had to make use of his hands. The circumference of the right knee measured twelve inches, that of the left thirteen inches and a half; there was widening of the head of the tibia. Pressure on the patella caused much pain; and on pressing together the tibia and femur, pain was referred to the head of the tibia, especially beneath the ligamentum patellæ.

Inversion of the leg hurt him on the outer side, and eversion caused him excessive pain in the same situation. A small abscess on the outer side, above the head of the fibula, was opened shortly after admission.

On the 21st of February Mr. Sydney Jones excised the joint. On making the section through the tibia a small sequestrum, fitting accurately the cavity it occupied, was divided. Its upper surface was not seen in the knee-joint; but on pressing it from below, the cartilage of the articular surface was raised. This piece of sequestrum, about the size of a small Spanish nut, was in the outer head of the tibia about the centre; looked at from the sawn surface of the slice of tibia removed, it was circular, about half an inch in diameter; it was quite movable, but seemed to be united by connective tissue with the wall of the cavity in which it was contained; the cartilage, however, was adherent nearly everywhere to its upper surface. The cartilage remained on the two heads of tibia: that on the outer head was much encroached on by synovial prolongations; where covering the sequestrum it was thinned and somewhat fibrous, and in front of this thinned and altered cartilage there was a line of ulceration leading to the above-described sequestrum. The slice of tibia removed varied in thickness, from a quarter of an inch (at margin) to three quarters of an inch (at spine of tibia). The patella was resected, and its lower overhanging margin removed; the cartilage seemed healthy, its marginal part encroached upon and replaced by synovial tissue.

Femur.—A quantity of connective tissue filled the notch between the condyles from the front of the outer condyle the cartilage had disappeared, and its place was taken by connective tissue firmly adherent to bone. This part of the condyle was depressed compared with the back half. Here the cartilage remained, but was thinned, and readily detached from the subjacent bone; its free surface was covered with filamentous tissue. On the inner condyle the cartilage remained, overlapped at the front part by synovial prolongations. The cartilage remained on the trochlear surface, was pinkish and very easily detached. The bone-tissue was everywhere dense and vascular. It was found necessary, in order to bring parts into good apposition, to take a second slice from the femur, so that the amount removed from this bone was about three quarters of an inch.

The deeper part of the sequestrum was gouged out, and torsion used for any bleeding vessels. The antiseptic treatment was used.

February 22nd.—Had some oozing during the night, necessitating the removal of the dressings and application of an ice-bag. Pulse 130; temperature $101^{\circ}8'$; complains of jumping of the leg. Tongue rather furred.

23rd.—Passed a very good night; at 11 a.m. temperature $103^{\circ}9'$; takes nourishment well—chicken broth, wine, and eggs; at 9 p.m. temperature $102^{\circ}2'$.

24th.—Has not slept well, on account of the jumping of the limb. Face rather flushed; tongue coated, dry; has much thirst. Pulse 112; temperature $100^{\circ}8'$.

25th.—Better; jumping of limb not so bad; slept well; temperature 100° .

26th.—Has had little or no sleep on account of noise in the ward; jumping of limb much less. Tongue coated; bowels sluggish; is very cheerful.

29th.—Has been doing well; wound discharging good healthy pus. Passed a large *ascaris lumbricoides* this morning. Tongue clean; complains of a little soreness of mouth and throat. Pulse quick; temperature has varied from 100° to 101° .

March 7th.—Wound healed all but the outer angle, which looks florid and healthy; tongue morbidly red; complains of pain in his chest, chiefly after taking food. Ordered Liq. Magnesiæ, with hydrocyanic acid and opium before principal meal.

13th.—Discomfort in his chest still complained of. *Santonine* gr. viij, *Sacch. Alb.*, gr. xvj; *statim sumend. et cras mane repet.* Several round worms were evacuated.

23rd.—Has been doing very well. A large abscess was discovered at the back of the left hip, and a quantity of sanious pus evacuated. He had not had any rigors, nor had he complained before to-day of any discomfort in the buttock. There was no continuity of mischief from the ham, *i. e.* this buttock abscess had not resulted from the burrowing of pus from the excised knee.

About ten days later a second abscess was found at the upper part of the left thigh, on the inner side; it had caused but little pain, and had not resulted from burrowing. The temperature about this time kept high, varying from 101° to $103^{\circ}2'$.

28th.—A water-bed was ordered, a good deal of discharge, not very healthy, coming from the buttock-wound; and as the dressing of the thigh abscess was interfered with by the presence of the splint, this was removed, and a leathern support applied. The resection wound had kept healed; and, on removal of the splint, pretty firm union of the bones was found to have occurred.

Anxiety was felt for some little time with regard to this patient; his temperature kept high; his tongue was morbidly red, and he looked pale and thin; he had some little disposition to cough, but no lung mischief could be detected. His appetite used to vary, and on three occasions *santonine* was had recourse to to get rid of *ascarides*. The thigh and buttock wounds healed up gradually, and at last soundly, and no further abscess occurred. The resection wound was disposed at times to reopen, and unhealthy ulcerations to occur in the neighbouring cellular tissue. Cod-liver oil, iron, and iodine, were all tried in succession. Bone union continued to progress satisfactorily.

On the 12th of July he was well enough to move about the ward with crutches; had a very firm straight leg, with about an inch shortening.

In August he was recommended for a convalescent hospital. Some delay in carrying this out occurred, and he did not leave the hospital until the 5th of October. A recent report describes his progress as very satisfactory. (See Plate V, fig. 9.)

In this case disease had been in existence for about five years. The patient had been under treatment by rest and counter-irritation, but without permanent benefit. When kept quiet, his pain and inflammatory symptoms were alleviated, although even then the jumping of limb characteristic of bone mischief (abscess or more frequently sequestrum?) disturbed him. When treatment by rest was discontinued the mischief became at once more diffused. His limb was useless, or worse than this. Pain and the treatment undergone had undermined his general health. It was necessary to do something. Amputation was not to be entertained. One diagnosed a sequestrum in the tibia from the widening of this bone and from the situation to which the pain was referred. This sequestrum had set up secondary mischief in the joint. One could not be quite certain where the sequestrum was, although his earlier symptoms pointed to the outer head of the tibia. Trephining at this point might have reached the sequestrum, but would probably have failed. Had its removal been affected acute suppuration in the joint would have followed, a very serious complication in his condition, and which would probably have resulted in amputation or something worse. Excision seemed to be the treatment to be selected. And this case argues strongly against those who would have advocated a partial operation, viz. the opening of the joint, search for a sequestrum, and no further interference. Here the mischief of bone could not have been apparent by exploration of the joint surface, for the sequestrum was only discovered on resection of the tibia.

CASE 8.—Disease of knee for two years; necrosis of tibia; secondary changes in synovial membrane and cartilages; excision; secondary hæmorrhage; recovery.

Maria Hutchins, æt. 32, married, was admitted into St. Thomas's Hospital on October 18th, 1871, under the care of Mr. Sydney Jones, with disease of the left knee. The knee had been swollen and painful for two years; it had been bad

off and on during that time. Since the previous Christmas she had had relapses every three or four weeks. This time her attack has lasted for six weeks. About the age of twelve she had had disease of the left tibia, and cicatrices of her former mischief were evident below the head of the bone. She had had also necrosis of the right humerus and diseased bone in both feet. Her bone mischief had lasted from twelve to seventeen years of age. On admission there was much swelling, fluctuating and pulpy, at the upper part of the knee, and there was tenderness and much aching pain complained of through the head of the tibia. She has suffered from severe startings of the limb, especially at night, has been quite unable to walk during the last month, and is unable to straighten the limb. The principal pain was felt, with or without movement, in the head of the tibia; there was no pain on pressing the femur or patella. After some rest on splint and blistering the synovial effusion was removed; still, she could not walk, nor did she dare to press the foot on the ground. She had no power to stand on the limb. The ligaments seemed all very lax, allowing free lateral movement.

On the 8th of November resection was performed by Mr. Sydney Jones. About three quarters of an inch in thickness was removed from the femur. When the joint was laid open there was much evidence of synovial disease; everywhere the membrane was thickened and injected, but especially in the pouch above the patella. In some parts there were prolongations on to the cartilage, as on femur, over the internal condyle, just to the inner side of the patella, where there was recent membrane easily torn off, and showing irregularly depressed and eroded cartilage beneath. Just below the patellar articular surface a thin synovial prolongation could be traced over the external condyle, and here the cartilage was depressed for a line or more; and, taking the whole under surface of the outer condyle, the outer half had its cartilage very much thinned from the joint surface, and, in fact, near the articular margin the cartilage was gone. The crucial ligaments were soft, and the intercondyloid notch was filled with connective tissue, vascular, retaining its redness after long maceration. The cut surface of femur was healthy. The patella was resected, and the slice removed with much synovial thickening. Except at the margin, there was no synovial overlapping.

In some parts the cartilage appeared thinned, and had undergone fibrous transformation; in other parts the cartilage was remarkably thickened, and appeared pulpy, more soft and velvety than usual, and quite a quarter of an inch in thickness.

The slice of tibia removed varied from a narrow edge behind to half an inch or more in front. There was very much synovial thickening and injection shown beneath the ligamentum patellæ, also along the convex margins of the semilunar cartilages. A thin connective tissue was prolonged from the outer border of the internal semilunar cartilage. The coronary ligaments, when cut through, showed beneath much vascularity of synovial fringes. The cartilage was soft and velvety in many places, yellowish or pinkish, and on free surface connected with firm fibrous or filamentous tissue.

The cut surface of the bone was everywhere dense and vascular. Just to the outer side of the centre there was in the part of tibia removed an aperture capable of giving passage to a large director; this aperture led, by a funnel-shaped sinus, about half an inch long, to the articular surface in front of the spine of the tibia, close to the attachment of the anterior crucial ligament. The resected surface of tibia showed a cavity filled with broken-down bone tissue (necrosial debris with

concrete pus). This material was cleared out with a gouge, and a cavity left capable of holding a Spanish nut. It was evident that in this case necrosis had occurred in the head of the tibia; this necrosis could not have been discovered by any operation short of excision. It had led to synovial mischief of the joint and changes in the articular cartilages. The resection was done under carbolic spray, and the antiseptic gauze was subsequently applied. The parts were more loose than in any excision of knee with which the author has had to do.

November 9th.—Did not have a very good night. Slept very little.

10th.—Had a better night. Tongue rather furred. Pulse 120; temp. 101.5°

11th.—Is feeling better than yesterday. Tongue still furred and pulse quick. Temp. at 10 a.m. 100.2°; at 9 p.m. 99.8°.

13th.—Improving. Takes food well. Tongue cleaner, moist. Pulse quieter. Wound discharges freely. Temp. at 10 a.m. 100°, at 9 p.m. 99.5°.

20th.—Seems very well. All sutures away except three, and these loose.

22nd.—Union has been very good everywhere except at angles, where there is copious discharge. Last night there was some bleeding, but the source was not ascertained. Wound ordered to be left exposed, covered only with carbolic lotion. To-day, about noon, there was again some very severe bleeding, controlled by pressure upon the femoral. This pressure was kept up for some hours by a tourniquet. In morning, temp. 99.8°; pulse 120. In evening, temp. 101.2°.

27th.—The hæmorrhage which had occurred necessitated changing of splint. The bandages had been much saturated. The change was effected very carefully, and gave great relief; temperature 99.7°.

29th.—No more hæmorrhage; temperature 99.4°; pulse 112°. The flaps much distended with clot; sero-purulent discharge from wound.

30th.—No recurrence of hæmorrhage. There was much swelling above patella, on the outer side; fluctuation detected; an opening gave vent to much pus.

December 2nd.—Discharge free from the opening recently made, and from the inner angle of the wound; is much better in her general health.

5th.—Fluctuation being detected on the outer side, an incision was made and much pus escaped.

9th.—Is improving; complains of less pain; appetite better; discharge less.

13th.—A pad of lint was used as a compress on the front and inner part of the thigh, to obviate a too great inclination inwards of the femur.

January 14th.—A small incision again made on the outer side, giving exit to a little purulent fluid. Union was not firm; this, no doubt, to be explained by the hæmorrhage which had occurred and the loose condition of parts after resection.

February 5th.—Union described as firm; wounds soundly healed.

March 7th.—Has been for a week or so wearing a leathern splint. The wound remained quite healed, but some time elapsed before bony union became so perfect as to allow the limb to be put to the ground.

She left the hospital on May 14th, 1871. The author has seen her several times since. She remains quite well; union is perfectly firm; she has no pain, and walks well without stick or other support. (See fig. 10, Plate V. In this the scar from previous necrosis of tibia is shown, as well as the deformity of right great toe from loss of bone.)

The above case presented one or two points of interest. Evidently necrosis of tibia had started the mischief of joint; the cavity in which the dead bone was contained led by a narrow sinus to the interior of the joint; synovial mischief followed, leading to superficial destruction of cartilage. But in other places the cartilage was much thickened, velvety and fibrous, these changes being specially marked about the patella. It would seem possible that a rheumatic element was super-added in this case; the above changes of cartilage and the great vascularity about ligamentous structures seemed to point to this, and, moreover, she had complained of rheumatism in the other knee and in the hip of the same side. The ligaments were all remarkably lax. The occurrence of hæmorrhage fourteen days after excision was unlooked for; it was considerable; and made matters for a time assume a serious aspect. The flaps were distended by clot. Pulsation, however, was to be felt in the tibials, and relieved one of anxiety as to ulceration of the popliteal artery having occurred from pressure of the posterior border of the tibia. Probably the source of hæmorrhage was one of the articular arteries. There was great delay in this case in the formation of bony union, but it ultimately occurred.

CASE 9.—*Excision of ankle.*

James A. Cannon, æt. 15, was admitted into St. Thomas's Hospital on the 27th of November, 1871. He had previously been under the care, at Bishop's Stortford, of Mr. John Morris, who sent the case up to Mr. Sydney Jones. In the previous spring a swelling appeared on the outer side of his right ankle, not attended at first with much pain. This swelling increased so as to involve the whole circumference of the ankle, and subsequently abscesses formed, leaving sinuses at the inner and outer sides of the joint; when admitted these sores were in an unhealthy sloughy state; there was much synovial thickening; the foot was in an extended position, and much pain was complained of on the least jar or movement. The boy had a scrofulous cachectic appearance. Four days later he had an attack of acute erysipelas, in the course of which there was profuse suppuration, and to relieve this free incisions were made. On the 23rd of January, 1872, the swelling of the joint was very much diminished, the diseased synovial membrane having apparently all sloughed away. The boy was suffering much pain and losing flesh fast; the least movement caused apparent agony, and elicited a grating sensation from the opposed bare bones, and a probe passed from the inner to the outer side of the foot through the ankle-joint. Mr. Sydney Jones, after consultation with his colleagues, determined on excision, looking upon the mischief

as most likely primarily synovial, the profuse suppuration resulting from erysipelas having subsequently caused necrosis of cartilages and baring of the articular surfaces. On the 24th of January excision was performed by longitudinal incisions on the outer and inner sides; about an inch or more of fibula was removed; the soft parts were carefully raised from the front of the ankle and from behind the internal malleolus; the foot having been dislocated outwards, and the tibia thus protruded from the inner wound, a thin slice of tibia, with the malleolus, was removed; and lastly, by a narrow saw introduced through the outer wound, the astragalus was resected. Very little hæmorrhage occurred; the parts were accurately brought together and fixed on a back splint with a vertical foot-piece, the whole being placed in a swing cradle. About 7 p.m. some collection of clot and oozing necessitated reopening of the inner wound; the hæmorrhage was found to arise from some periosteal vessels, and from a branch of the internal saphenous vein divided longitudinally; it was arrested by the use of a red-hot fine wire. Temperature at 10 p.m. 99·4°. The bone surfaces removed were quite denuded of cartilage; the bone structure was firm, and resembled the surface of loaf sugar. There was no recurrence of bleeding. The operation relieved the patient wonderfully; he was free from pain, slept well, his pulse and general condition improved, and he gained materially in flesh; the wounds progressed rapidly, although some pretty free discharge occurred along the course of the peronei. The limb was taken out of splint for the first time on the 26th of March, two months after resection. There was then firm bony union, and the line of the foot with the leg was very good. One or two points of discharge still remained, and were treated with sulphate of zinc lotion. He left the hospital with a sound and symmetrical foot and ankle, and could bear any amount of pressure. There was about three quarters of an inch of shortening. There did not seem to be any movement at the site of the original joint. Several visitors (English and foreign surgeons) at the hospital saw this case on recovery, and stated their inability to discover that any resection had been done. The cast is in the hospital museum, and shows well the condition of the foot and lower part of the leg. (See Plate VI, fig. 12.)

The above seemed a typical case for excision. Evidently the mischief had commenced as strumous disease of the synovial membrane, and at the time of admission had extended to the cartilages and bones. The attack of erysipelas caused acute inflammation of the structures involved, leading to sloughing of the diseased synovial membrane and cartilages. The result was bared opposed surfaces of astragalus and tibia. The state of the patient necessitated some interference; his sufferings were great, and the discharge was profuse and exhaustive. The parts were satisfactory for excision; all the diseased synovial membrane had been got rid of, there was none to be dissected away. There was no reason to suppose any bone mischief deeper than the surface. It was only necessary to remove thin slices of astragalus and tibia. The operation

selected (by two lateral incisions) seems the most satisfactory ; it looks formidable, but is tolerably easy of performance ; by it fewer structures are divided, hæmorrhage is not great, and the wounds are in a good position for drainage.

CASE 10.—*Excision of wrist.*

Edward Davis, æt. 42, a smith, was admitted into St. Thomas's Hospital, under the care of Mr. Sydney Jones, on the 9th of December, 1871. About five years previously he received a blow with a piece of iron on the palmar surface of the left wrist ; this became very painful, so that he was unable to use it. About a month afterwards a lump came on the back of the carpus ; this lump increased, and the swelling ultimately involved all the parts entering into the wrist-joint. He had managed to get on imperfectly with his work up till last Christmas, except now and then, when the pain was more than ordinary. The joint was at Christmas very much swollen, very painful and tender. Five or six weeks before admission sinuses formed on the palmar surface, one about the middle, another near the ulnar side. He had been under treatment at several hospitals since the wrist was first damaged. Iodine and splints and constitutional treatment had been diligently had recourse to. There was no history of syphilis. On admission there was very much deformity. The radius and ulna were very prominent posteriorly, and suggested either bone inflammation with possible necrosis of radius, or morbid growth, or dislocation of carpus beneath bones of forearm. The swelling was so great and confused as to prevent an accurate diagnosis.

The left hand was useless ; it had to be supported by the other one. The patient had at times a good deal of pain, and the parts were tender on pressure ; any movement of the limb caused suffering. The sinuses allowed a probe to pass to bare bone. A third sinus formed, a little later on, on the ulnar side of dorsum of radius. He was for one month after admission kept on a splint, and iodide of potash (5—8 gr. t. d.) was administered, but no progress was made, so that, on the 10th of January Mr. Sydney Jones proceeded to explore. An incision was made along the inner side of the ulna, corresponding to the sinus in this situation. On introducing the finger it was evident that dislocation of the carpus had occurred, and that bone mischief was more extensive than what seemed indicated by examination of the sinuses. By simple exploratory incision it would have been impossible to reduce the dislocation which had occurred, and which, by the displacement and stretching of the tendons in front and behind, threatened to destroy all use in the fingers. In fact, he had but very little power to move them, so that it was determined to do a complete operation—one which would remove all disease and at the same time correct the deformity.

The excision was done in the mode advocated by Mr. Lister (see p. 293 of vol. ii of 'Hospital Reports'), viz. an oblique incision was made in the dorsum, parallel to the tendon of the extensor secundi internodii pollicis, and a second incision was made along the inner border of the ulna and palm. The displacement which had occurred of the carpus made the operation by no means easy, and the tendons were

so matted as to obscure one's landmarks; however, the tendons were carefully raised from the bones, and only the extensors of the wrist (extensores carpi radialis longior and brevior, and carpi ulnaris) were divided. On the palmar surface the flexor carpi ulnaris was detached with pisiform bone. By cutting forceps the carpal bones (except the trapezium) were removed *en masse*. The ends of the radius, ulna, and four inner metacarpal being protruded, were sawn off. The lower part of the trapezium being fixed, apparently by firm bony union, to the first metacarpal bone, was allowed to remain; the radial part of it, bare and roughened, was clipped off by forceps. Disease had involved the radio-carpal and carpal joints; most of the surfaces of the carpus had lost their cartilage, and the bones were for the most part bare, in some places covered with connective tissue. The radius and ulna had their cartilage replaced by fibrous tissue. No hæmorrhage of importance occurred. The hand could now be brought into a line with the forearm.

The parts were accurately united by sutures, and the whole fixed on a properly padded splint.

January 15th.—Has been doing pretty well since the operation. There has been a little, but not much, feverishness. Has not much appetite. The parts have been much swollen, and the wounds are now discharging a good deal; w. w. d. applied. Temp. 101.5°. Passive movement was begun in the fingers in the course of a few days; at first painful, it was very sparingly applied.

29th.—The hand is looking very well; wound healing rapidly. There was nothing further of particular interest to be recorded in the progress of this case. The swelling gradually subsided, and the discharge became less. His general health had kept good throughout.

On March 9th there was but very little discharge. He bore movement well, and himself had great power of controlling the thumb and fingers.

28th.—Swelling nearly subsided; parts very firm; has considerable movement in the fingers; sinuses nearly closed.

He left the hospital on the 1st of April, 1872. There were two sinuses still open—one in the palm, another on the dorsum; these allowed a probe to pass towards the same bit of bare bone, which seemed to be the proximal end of the fourth metacarpal bone. A small piece of bone escaped from the sinus on the back part of the hand on the 30th of April.

On the 11th of September a sinus still remained open, leading to the bare end of the fourth metacarpal bone; the sinus was laid open and the necrosed bone removed. He was seen in November. Parts were soundly healed. The movement of the thumb towards the fingers was very considerable; the fingers also possessed considerable movement. (See Plate VI, fig. 11.)

In this case the damage received five years previously had set up mischief in the carpus. There was no evidence of dislocation having occurred at the time of injury; this had taken place from progressive carpal disease. The general swelling and the absence of special projection in front of the bones of the forearm made it difficult, if not impossible, to diagnose this

dislocation. The projection, and apparent enlargement posteriorly, induced some to imagine either inflammatory mischief or morbid growth of radius. The exploration of sinuses proved the existence of necrosis in the carpus. It was determined to explore, and this exploration showed that no operation short of excision would suffice to remove all the diseased structures and at the same time restore the hand to its normal position with the forearm. The result showed the propriety of the operative interference had recourse to; the hand was brought into a line with the forearm, all diseased structures were removed, all pain subsided, the flexor and extensor tendons recovered to a very great extent the power lost, and the limb regained to a considerable degree its usefulness.

Unfortunately there are to be added to the foregoing cases three others, the result of which was unsatisfactory. In one of these, after repeated shiverings and after all chance had disappeared, from the condition of wound, of a successful result from excision, amputation was performed; recovery occurred, but the patient had several secondary abscesses. In the other two cases death occurred from pyæmia.

CASE 11.—*Disease of knee for three years; abscess and necrosis of femur; excision; pyæmia; secondary amputation; recovery.*

Eliza Dodman, æt. 12, was admitted into St. Thomas's Hospital, under the care of Mr. Sydney Jones, on the 2nd of May, 1872. She was tripped up about three years previously, striking her right knee against a kerb, and had ever since walked lamely. She had had several falls more recently. She had a severe attack of scarlet fever four years ago, and had since been deaf; she then had effusion into both knees and left elbow-joint. On admission the knee was much bent, and ankylosis seemed to have occurred to a great extent. There was much starting of the limb at night. It was found very difficult, on account of her deafness, to make out in what situation pain was most felt; movement in any direction apparently caused much suffering. It was attempted by American extension to secure a better line of limb, but this extension seemed only to aggravate her symptoms. There was no kidney mischief to be detected.

On the 15th of May Mr. Sydney Jones excised the joint. On section of the tibia the bone was of a somewhat suspicious yellowish colour, and "a material oozed up, which might have been fat, but which looked like pus." Such is the account given by the registrar (Dr. Saunders).

The material was not examined, but was such as is not unfrequently seen on saw-section of bone whose cancellous tissue is fatty.

Femur.—There was a small abscess cavity in the outer condyle, and on making

a further section of bone another cavity was opened, containing a small sequestrum. Connective tissue had taken the place of the articular cartilage on the front half of the internal condyle; on the back half the cartilage remained, covered with delicate filamentous tissue. On the trochlear surface the cartilage remained, with synovial tissue covering it. Behind, also, the external condyle still retained its cartilage; intermediately, however, the cartilage was gone, its place taken by connective tissue. The cartilage of tibia and patella was overlaid by delicate membranous tissue.

The sawn surface of femur seemed healthy. The bone surfaces were very vascular, and free oozing occurred. The parts were securely fixed on the excision splint.

May 16th.—Has been very sick. The sickness lasted until the evening of the 17th. Pulse quick and feeble; temp. varying from 100.2° to 100° .

18th.—Temp. 99.2° in morning; at 7 p.m. temp. 101° ; pulse stronger. Sickness now very little.

19th.—Tongue somewhat furred. Bowels not relieved since the operation. Mild aperient ordered. Temp. rose at 10.30 p.m. to 103.3° ; pulse very quick.

20th.—At 9 a.m. temp. 101.4° . Slept for some hours under the influence of a morphia injection. Wound looks inflamed. Had a rigor, which lasted five minutes. Complains of pain and a feeling of tightness about the upper region of thorax. Later in the day her temp. rose to 103.4° .

21st.—Bowels have been well relieved. Temp. 103° ; pulse 120. Tongue dry and coated. Complains of pain in head, but is relieved of the feeling of tightness in the thorax. At 4 p.m. temp. 106.8° . Had a rigor lasting twenty-five minutes. At 10 p.m. temp. 103.5° .

22nd.—Still complains of headache. Temp. at 9.30 a.m. 101.6° ; at 2 p.m. 102° .

24th.—Seems better. At 9 a.m. temp. 100.2° . Takes nourishment well. Has had but little sleep. Tongue moist, but coated.

26th.—Temp. at noon 102.8° ; at 10.30 p.m. 104.4° . Very great discharge on outer side.

27th.—Temp. at 11 a.m. 102.6 . Has passed a restless night. Slough discovered on the outer side of the thigh, about the middle, with sinus leading from it to the site of excision. At 11 p.m. temp. 103.2° .

28th.—Another rigor; temp. during it 103° .

29th.—Has taken nourishment well. Temp. from 102° to 102.7° .

30th.—A rigor, lasting about ten minutes. The wound does not look so inflamed as previously, but gapes so as to expose the bone very much. Complains of pain in the ankle-joint of other leg, which looks red. A day or two later some pustules were noticed on the arms.

31st.—The splint was shifted under chloroform. No attempt at union had occurred, and there was great and offensive discharge from above and below the excision wound. Temp. 102.8° . Patient very much weaker. The repeated rigors, the high temperature, her sallow appearance, anxious expression, the sensation of oppression in thorax, and the pain complained of in left ankle, made one fear the existence of pyæmia.

Locally (in excised parts), her condition was not improving,

and one could not anticipate a good result; constitutionally, she appeared to be somewhat on the mend. Amputation seemed to afford her a slender chance of recovery, and a proposition to this effect was made to the parents.

On June 1st the patient appeared a little stronger, and had taken a fair amount of nourishment. Temperature 101.2° . At 3 p.m. the thigh was amputated about the middle by Mr. Sydney Jones. Very little blood was lost during the operation; a small amount collected was watery and dark coloured, and not very readily coagulating. All disorganized tissue was as far as possible removed. The femoral was twisted; the tissues were so rotten about the smaller vessels that fine ligatures had to be used; the sawn surface of femur appeared healthy, but the periosteum very readily separated. No repair seemed to have occurred of the resected bone surfaces; a vertical section of the femur showed purulent infiltration of the cancellous tissue for a couple of inches above the resected surface; the cancellous tissue of the tibia appeared healthy. At 8 p.m. she had rallied considerably from the operation; temperature, 98.6° ; pulse 130—140. No sickness nor hæmorrhage.

2nd.—Temperature at 10 a.m. 97.2° , at 7 p.m. 101.5° .

3rd.—Had slept pretty well during the night. Pulse stronger; tongue and skin moist; temperature in morning 100.2° , at night 103° .

5th.—Temperature 101.2° ; had a rigor, which lasted twelve minutes, temperature during it 102.8° . Tongue clean and moist; takes nourishment well; has a bed sore threatening over sacrum; water-bed and full doses of quinine ordered.

9th.—Sweats very much at times, especially during the night; temperature 100.2° ; has been gaining ground; the pain previously complained of in the left ankle gone, but now suffers pain in the heel; no suppuration detected. She went on gradually improving, her temperature varying from 99.4° to 101° ; the pulse gained in power, she took nourishment well, and her appearance was more healthy.

18th.—A small abscess was opened in the left axilla.

21st.—Deep-seated pus evacuated from the under surface of left os calcis.

23rd.—Temperature 101° . There is great discharge from the left foot; her stump now looks well, although some sloughing of the anterior flap has occurred.

28th.—Much discharge from the heel wound; this was explored, and a loose exfoliation, about the size of a fourpenny piece, found and removed.

The removal of this sequestrum was followed by rapid healing. All her symptoms progressed without any further drawback. She left the hospital well on the 1st of August, with her stump quite healed. She went then into a convalescent hospital, and here some anxiety was felt on account of the formation of an abscess, reported large, in the left side of the abdominal wall. She recovered, however, from this, and has been seen since by the author in good health and spirits.

The above was an extremely interesting case throughout.

The mischief of knee would seem to have been primarily from bone damage, no doubt induced by the blow received three years previous to admission; the contiguity of this bone mischief to the joint had set up secondary synovial disease. It would have been impossible to reach the abscess and sequestrum which were found in the outer condyle of the femur by any other mode than the one adopted. There was no sinus, and although bone mischief was diagnosed one could get no satisfactory indication as to its exact whereabouts.

Five days after the excision of knee she had her first rigor, and several rigors, more prolonged, subsequently occurred. Her general condition indicated pyæmic poisoning. Fourteen days after excision there seemed some inclination for the constitutional symptoms to improve; the local conditions—opening out of the wound, baring of the bone ends, and profuse suppuration extending upwards in the thigh and downwards in the leg—destroyed all hopes of repair, and, no doubt, served to pour into the system the elements of pus and putrid poisoning. Amputation was therefore proposed. The femur showed considerable osteo-myelitis.

One rigor followed amputation. Secondary abscesses formed in the axilla, on the surface of the os calcis, and in the abdominal wall.

It is curious that the last abscess formed some time after leaving the hospital, and when the stump wound was perfectly healed. The good result, so far as concerned the pyæmia, depended on the secondary abscesses having occurred superficially, not in the internal organs. The inflammation which showed itself at one time in connection with the left ankle subsided without the formation of any abscess.

In the following case an abscess in the tibia near the articular surface set up disease of the knee-joint.

CASE 12.

Alfred Houghton, æt. 21, formerly a sailor, now a telegraph clerk, was admitted into St. Thomas's Hospital on the 30th of January, 1872. Eighteen months previously the right knee became stiff and swollen; this was not accompanied by much pain at first, and at the time the knee first became bad he was a sailor, and thinks it possible he may have sustained some injury when kneeling to scrub the decks. For six months the knee continued much swollen. He was obliged to give up his occupation as a sailor and select a sedentary employment

any extra exertion always caused increased swelling, and he was laid up with periodical attacks of severe inflammation. It always hurt him when walking or when he caught his foot against anything; moreover, when at rest, he suffered shooting pains on the inner side, worse in the night and towards morning. On admission there was stiffness, and any attempt to flex caused pain; eversion was attended by pain on the inner side; there was no pain on striking the heel. There was some synovial thickening; the patella was movable; there was enlargement of the head of the tibia, especially on the inner side. Pressure over the inner tuberosity caused pain. The circumference of the right knee was three quarters of an inch more than that of the left. Has had good health; no history of syphilis. His limb was fixed on a splint, Pot. Iod. gr. v t. d. ordered, and some leeches over the inner head of tibia.

February 3rd.—The pain had been relieved by the leeches followed by fomentations.

19th.—Since the 13th an ice-bag has been applied. The knee is better, free from pain unless manipulated.

28th.—There was still much pain and swelling about the inner head of tibia. Mr. Sydney Jones made an exploratory incision over the lower attachment of the internal lateral ligament; bare bone was met with, covered over by exuberant granulations, but no sequestrum was removed. The leg was replaced on a Liston splint, and an ice-bag applied.

March 6th.—A collection of matter at the lower angle of the wound was evacuated.

7th.—Ill-formed stinking pus discharging. Pulse quick; aspect anxious; much starting of limb. The countenance was sallow, but there had been no rigors.

9th.—Mr. Sydney Jones excised the joint. There was free suppuration in the interior.

Femur.—Internal condyle in front covered by connective tissue, behind by thinned and shreddy cartilage. External condyle quite stripped of cartilage posteriorly; bone bare and rough; cartilage of trochlear surface present, but undermined and threatening to detach *en masse*. About the tibia there was much development of connective tissue; an abscess cavity was exposed on resection quite at the back and outer part of the inner head; this reached nearly to the joint surface, was circular on section, and its cavity would have held a large Spanish nut. Around the patella was much development of connective tissue overlapping its margin; the cartilage was loosened.

Temperature after operation 98°; at 11.50 p.m. 104.2°.

10th.—Slept well; temperature in morning 103°; at 8 p.m. 104.3°.

11th.—Was sick twice; at 10.30 temperature 101.2°; at 8 p.m. 105.5°.

12th.—At 11 a.m. temperature 102.3°. Takes food badly; aspect sallow and very anxious.

13th.—Seems somewhat rallied. Temp. at 11 a.m. 102.1°; at 9.45 p.m. 104.2°.

14th.—Has had a bad night, with much sickness and muttering delirium. At midnight temp. 106°.

15th.—At 11.15 a.m. temp. 101.6°; at 9.30 p.m. 103.2°. Had a rigor, lasting ten minutes. Refuses food and stimulants.

He died on the 17th of March.

A post-mortem examination was made fifteen hours after death by Dr. Payne, and the following are his notes :

Pleura, right.—Much intense inflammation of lower part, principally the pulmonary surface. *Left.*—No affection of parietal pleura, slightly of pulmonic.

Lungs.—Upper lobe of right containing several pyæmic blocks; larger and more advanced blocks in middle and lower lobes. In the left lung both lobes contained pyæmic blocks, less advanced than most in the right lung.

The *liver* was soft and slightly yellowish.

Other viscera healthy.

Iliac, femoral, and popliteal veins on the affected side quite natural, and containing no clots.

In the retrospect of the above case the author regrets much that he was induced to have recourse to an exploratory incision; no doubt a resection at the onset would have had a better chance of a good result. By the exploratory incision acute suppuration would seem to have been set up in the diseased joint. It might be advanced by some that trephining through the inner head of the tibia would have reached the abscess, but to have reached it, situated, as it was, at the back part of the tibia and close to the median line, would have involved a very deep use of the trephine. This, it is true, would not have been of moment had the abscess been reached; but one was of necessity uncertain as to its exact position, and, most probably, had a trephine been used, the abscess would have been left unopened. In the author's opinion resection at the onset would have been the best treatment. The acute inflammatory condition subsequently induced in the joint and system was unpromising for the success of an excision or any operative interference, and although there had not been any rigors it is possible, from the anxious and sallow appearance of the patient, that pyæmic mischief had started before excision was done. The patient and his friends objected to amputation; the free incisions made failed to effect improvement; so that excision, although in the inflamed condition of parts unpromising, was had recourse to.

In the last case of this series to be recorded a very unusual form of disease existed, viz. necrosis of the patella, leading to disorganization of the joint. The patient was a very unhealthy subject; symptoms were somewhat acute; there was consider-

able irritation of the system, and amputation would have promised a better result had one been able to persuade the patient and his relations to submit to this. They objected strongly to any such mutilation, although the risks of any conservative operation were fully explained to them.

CASE 13.

Henry Goldsmid, æt. 21, a painter, but formerly a soldier, was admitted into St. Thomas's Hospital under the care of Mr. Sydney Jones, on the 25th of March, 1872. Two years previously he had struck his right knee forcibly against a brick, was laid up for some time, and then got about, but with limping. Some weeks later he received another blow. He then went into one of the metropolitan hospitals, remaining there only a month. After leaving this he stated that he had not suffered much pain; swelling, however, remained, and the joint became stiffened when not used. About a week before admission, in trying to save himself from falling, he violently strained his bad knee, this becoming doubled up under him. On admission there was much deformity by swelling and partial dislocation. The principal swelling was over the femur. There was acute tenderness all over the joint, especially marked in the neighbourhood of the patella. Every movement gave very great pain. Fluctuation could be detected on front and inner side of joint. His general health was not good, his habits had been very irregular; he was emaciated and suffered from cough; was irritable and intolerant of restraint in any way; has an enlarged and painful gland in the groin. His limb was placed on a Liston splint and Hirud. xij applied.

Under the influence of rest and treatment the swelling subsided and fluctuation became less, only, however, to make the displacement of the tibia more evident. The sensation about the joint was now boggy, and there seemed no point whence pus could be evacuated. Still, there was much tenderness on pressing together the bone surfaces; the least jar caused much suffering. His general condition was not improved. The temperature was high, and the pulse quick and feeble; the tongue was red at tip, disposed to be aphthous, furred at base, and sordes tended to accumulate about the lips. There was a general irritability of the system. Free incisions would have disposed to general suppuration of the joint, in which there was hitherto no evidence of pus. He was in an unsatisfactory condition for any operative interference. It was necessary to do something. Amputation was proposed as the desirable operation, but not acceded to.

On the 6th of April excision was had recourse to, but reluctantly; a hope, however, existed that by the removal of the extensively diseased structures of the joint, if he could sustain the shock, much irritation of the system would be got rid of. There was much membranous exudation in the joint, but no pus. On the outer side of the patella, on the under surface, there was a considerable bit of necrosis, quite loose; the cartilage in its neighbourhood was detached from the subjacent bone. The capsule was much thickened, and much connective tissue developed about the articular margins of the femur and tibia. On the outer condyle, at the back half, the cartilage was firmly adherent to the bone, showing evidence of change on its free surface. The cartilage of the trochlear surface and of the

whole internal condyle readily peeled off *en masse*. The cartilage was loose on the back part of the inner head of the tibia, the rest was firmly attached; that on the outer side was firm, its free surface covered by delicate filamentous tissue. The resected bone surfaces were healthy. The parts were securely fixed on the excision splint. The temperature at 8.30 p.m. was 102° ; pulse 132.

April 7th.—In the night he had managed to undo the perineal pad and upper part of the thigh bandage. His temp. at 9 a.m. was 103.4° ; at 11 p.m. 102.4° . There was no sickness, and altogether he seemed improved, but he was a most difficult patient to manage. During the next few days he took food well, and his pain and general symptoms had been much relieved by the operation, but he kept remarkably weak. His temperatures were—

8th.—8 a.m. 102.2° ; 9 p.m. 103° .

9th.—8.30 a.m. 100.2° .

10th.—11.20 a.m. 102.8° ; 9 p.m. 102° .

11th.—11.20 a.m. 102.6° ; 9 p.m. 101° .

12th.—9 p.m. 101° .

There is considerable œdema of the leg below the knee; an incision was made on the inner side, and pus evacuated; some separation of the edges of the wound.

13th.—Temp. 9 p.m. 103° .

14th.—At 11.40 a.m. temp. 103.6° . Some redness over the outer condyle of the right elbow; acute tenderness here and in the left groin. There had been no rigor. Tongue furred. At 9 p.m. temp. 103.2° .

15th.—At 9.45 a.m. temp. 103° ; at 9 p.m. 103.2° .

16th.—At 9 p.m. temp. 102° .

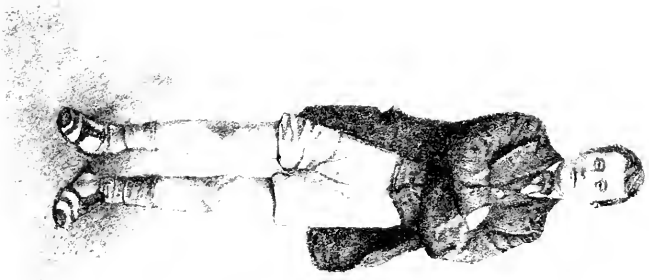
17th.—At 9 a.m. temp. 102° . There were aphthous patches over the tongue. One had for some days given up hope of any successful result. The countenance was now sallow and pinched. There was less pain in elbow, but a fluctuating point was opened. The tenderness in groin had subsided.

He died on the 19th of April. No post-mortem was allowed.

The four above-described unsatisfactory results (three deaths, one secondary amputation) have played great havoc with the author's statistics. His first twenty-three excisions of knee, (an analysis of these and others will be given in a future paper) showed only two bad results, but these were deaths. Then followed in succession three deaths and one amputation. So that in twenty-seven cases there were five deaths and one amputation. According to the author's present experience he would not again resort to excision under the conditions which were presented by three of the above fatal cases. Of these three, in one there was spinal curvature interfering with a proper position of limb, the other two are the cases of Houghton and Goldsmid, above described. He has recently done five

more; these are still under treatment, two of them are nearly well, the other three progressing satisfactorily. Of the five deaths, one occurred, in a subject with granular disease of the kidneys, from shock, vomiting, and erysipelas; the other four died from pyæmic symptoms, in only one, however, verified by post-mortem. It is curious that in the case, too, where secondary amputation was necessitated, rigors, secondary abscesses, and other evidences of pyæmia, existed.

Of other excisions the author's experience has been more limited; but hip excisions seem unsatisfactory; wrist excisions are satisfactory, but their treatment is prolonged; elbow excisions are satisfactory.



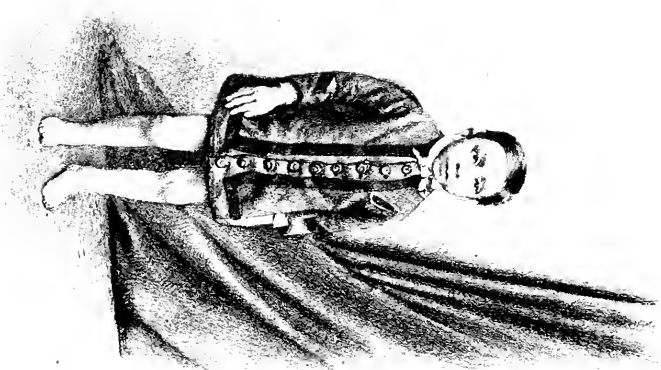
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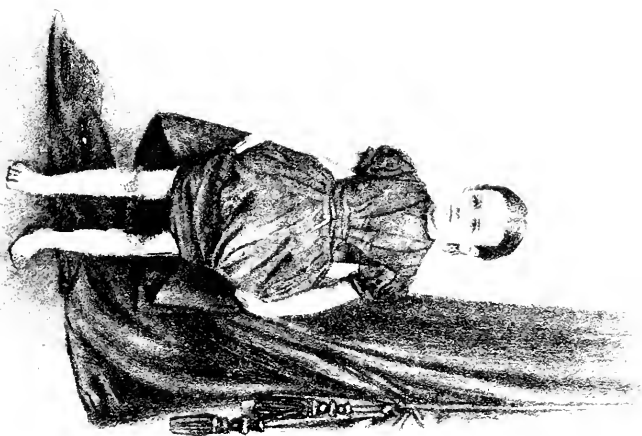
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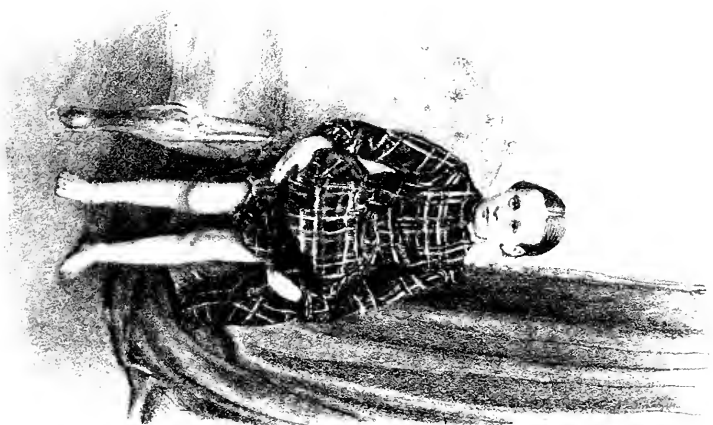
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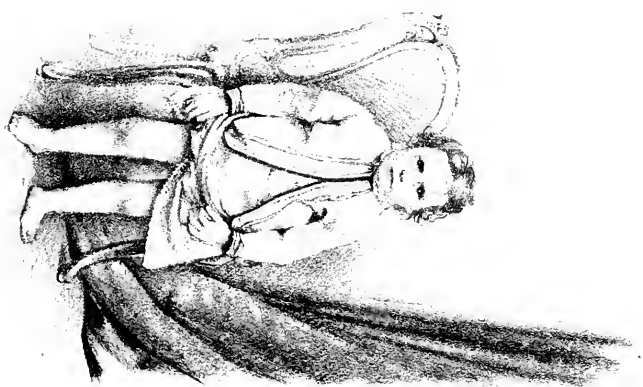
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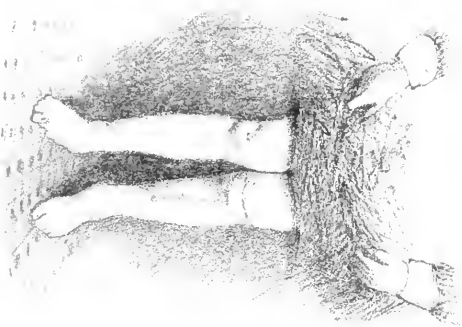
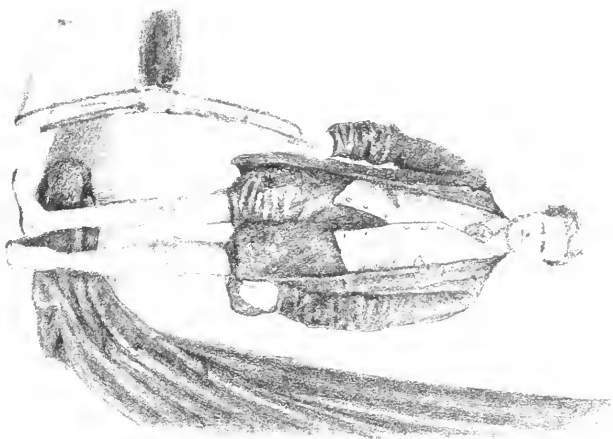
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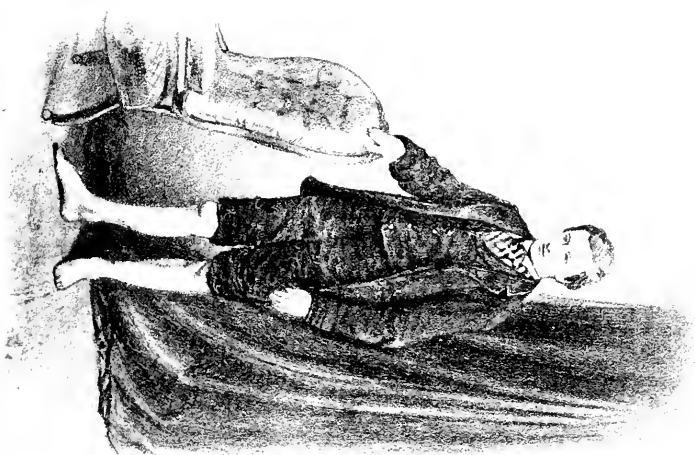


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APPENDIX

TO THE PAPER ON

VARIETIES OF GENERAL PARALYSIS.

By FREDERICK POLLARD, M.D.

WITH

EXAMINATION OF SPINAL CORD,

By J. LOCKHART CLARKE, M.D., F.R.S.

Termination of Case 1 (note by Dr. Pollard).

THE patient, James W—, died on January 20th, 1873. Mr. Swain kindly gave me an opportunity of being present at the autopsy on the following day.

There was no evidence of fracture or other injury of the skull, and the dura mater appeared to be natural. The brain weighed $51\frac{1}{2}$ ounces. There were numerous milky opacities of the arachnoid and pia mater on the upper surface of the hemispheres, and they were equally numerous on the two sides. The membranes were not particularly adherent. The grey substance was very narrow. The white matter was generally firm and healthy looking, but was somewhat soft in one or two spots. The ventricles were much distended with clear fluid. There was no evidence of effusion of blood having taken place in any part of the brain; no inflammatory products were visible, nor was there any sign of disease having commenced at one part of the brain more than another. The parts at the base appeared healthy.

After his admission into the asylum the patient had gradually become more and more helpless, and towards the last large

bed-sores had formed. Some little time before his death he had an attack of convulsions—a common occurrence in general paralysis of the insane.

Examination of Spinal Cord and Medulla Oblongata.

By J. LOCKHART CLARKE, M.D., F.R.S.

In the conus medullaris and the lower two thirds of the lumbar enlargement nearly the whole of the anterior grey substance was very much softened, and in some places quite pulpy. The superficial part of the posterior columns was nearly in a similar condition, the pia mater covering them being somewhat thickened. In the upper third of the lumbar enlargement the grey substance was not much altered, but the surfaces of the posterior columns were softened to a considerable degree, and sclerosis, or destruction of the nerve fibres, with proliferation of the connective tissue, extended deeply through these columns, nearly to the surface of the transverse commissure between the bases of the posterior horns, as represented at *a, a*, Fig. 1. The sclerosis, however, was limited chiefly to the cuneiform strands of these columns, or those wedge-shaped portions which lie on each side of the posterior median fissure. This morbid change was everywhere accompanied by an innumerable multitude of compound granular corpuscles of different sizes, by oil-globules, and great increase of connective tissue corpuscles.

At the upper roots of the twelfth dorsal nerves both the anterior and posterior grey substance were damaged by softening and disintegration. This change was greater on the left side. The superficial parts of the posterior columns were much softened. At the tenth dorsal vertebra the grey substance was considerably less damaged, but the sclerosis and disintegration of the cuneiform or inner strands of the posterior columns were still more marked than in the inferior portion of the cord, as shown in Fig. 2, *a, a*. The surfaces of the posterior parts of both lateral columns were in a similar condition, as may be seen at *c, c*. At the ninth dorsal vertebra, about the superficial third of the posterior and lateral columns, and the surfaces of the anterior columns were quite soft, the deeper portions of the

cuneiform strands of the posterior columns having undergone an advanced state of sclerosis, with increased development of connective tissue and corpuscles. The whole of the anterior grey substance was completely softened. Nearly the same morbid condition extended throughout the rest of the dorsal region, the upper portion being even more deeply and extensively damaged, while the pia mater over the posterior columns was considerably infiltrated and thickened.

In the cervical enlargement the grey substance was very little affected, but the posterior and lateral columns were more severely damaged by sclerosis than in the inferior regions of the cord. Fig. 3 represents a section of the lower part of the cervical enlargement. Here we see that the median or cuneiform strands (*a, a*) of the posterior columns are destroyed through their whole depth by sclerosis, and that some portions of the outer strands (*b, b*) of these columns are affected in a similar way. The lateral columns (*c, c*) were also more extensively affected by sclerosis than below.

These morbid appearances increased on ascending to the medulla oblongata. Fig. 4 represents a transverse section immediately below the points of the anterior pyramids. Here it is seen that the cuneiform strands of the posterior columns are entirely destroyed, and that only a small portion (*a*) of each outer strand remains intact. From the surface of the latter the tract of sclerosis extends continuously over the caput cornu posterioris to the lateral column (*c*).

On ascending through the medulla oblongata the posterior pyramids, with which the cuneiform strands of the cord are continuous, were similarly affected with sclerosis, as were also the superficial portion of the restiform bodies, which are continuous with the outer strands of the posterior columns of the cord.

In all the sclerosed parts, and always in proportion to the advanced stage of the morbid process, the blood-vessels presented a singularly abnormal appearance. They had lost their natural structure, were frequently severed into small fragments (as represented in the variously short and dark lines in all the figures) by progressive disintegration.

The nerve-cells that were not destroyed by the inflammatory action were somewhat altered in appearance. They contained

more brown pigment than usual, and were in the first stage of degeneration.

It is quite certain that the morbid changes above described were the results of an inflammatory condition of the whole substance of the cord, the inflammatory action varying, as is usual in such cases, in extent and severity at different regions of the cord, and at different parts of the same region.

EXPLANATION OF THE PLATE,

Illustrating Dr. Pollard's paper on Varieties of General Paralysis.

Fig. 1.—Transverse section of the lumbar enlargements of the cord.

a, a. Inner or cuneiform strands of the posterior columns.
b, b. Outer strands of the same columns.

Fig. 2.—Similar section at tenth dorsal nerves.

c, c. Patches of sclerosis in posterior part of lateral columns.
e, e. Posterior vesicular columns.
d, d. *Tractus intermedio-lateralis* on each side.

Fig. 3.—Similar section of lower part of cervical enlargement.

Fig. 4.—Similar section immediately below the points of the anterior pyramids of the medulla oblongata.

Fig 1.

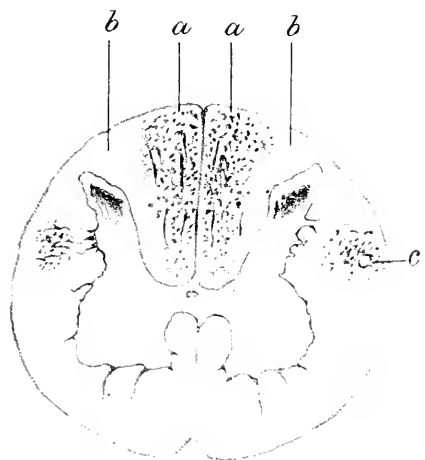


Fig 3.

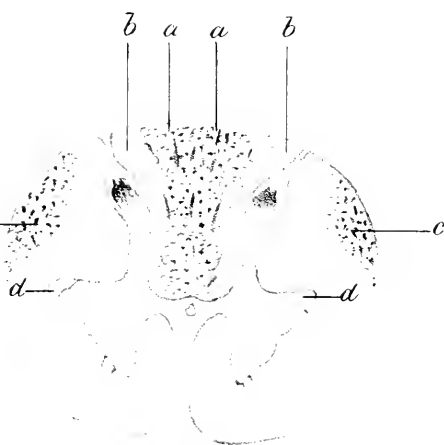


Fig 2.

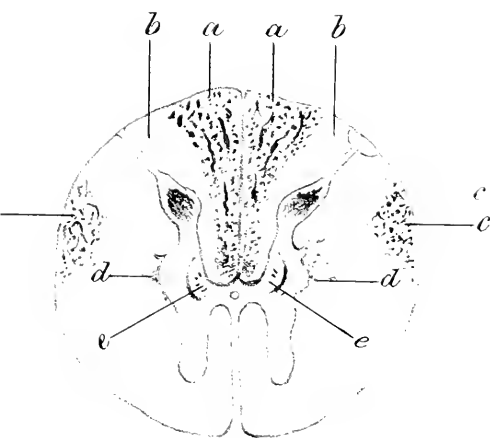
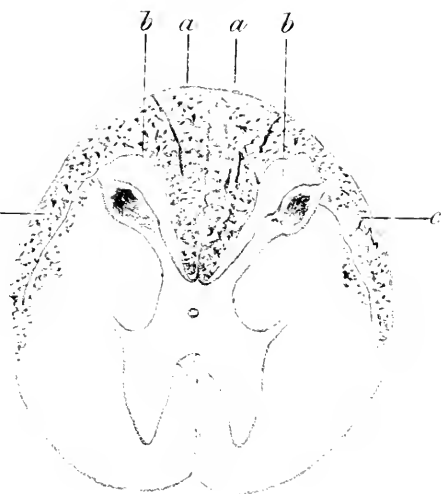


Fig 4.



REPORT OF
THE OBSTETRICAL DEPARTMENT.

By HENRY GERVIS, M.D. LOND.

THE report of this department in the volume for last year contained an account of the work done in it from Dec. 6th, 1869, to Dec. 6th, 1870. The present report extends from Dec. 6th, 1870, to Dec. 6th, 1871. The resident accoucheurs who held office in the twelvemonth were—Messrs. Osborne, Ellis, Slaughter, Franklin and Addy.

During the twelvemonth 1082 cases were attended; less therefore by 150 than the number attended in the previous year. This diminution was doubtless due, in the first place, to the partial suspension of work, which occurred during the process of transferring the hospital from the Surrey Gardens to the Albert Embankment, and then to the fact that the district of its operations being changed it necessarily required time for the poor of the new district to become acquainted with the advantages open to them.

Of the 1082 cases attended 10 resulted in twin births, so that the total number of children born was 1092.

Of the 1092 children born 1040 were born alive, and 52 were stillborn, or 4·75 per cent.

Of the 1040 born alive 536 were males and 504 females.

Of the 52 stillborn children 34 were males and 18 were females.

Of the stillbirths for the present year the proportion,
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therefore, of males to females is much larger than it was last year, when out of 44 stillborn children 27 were males and 17 females.

I regret that I am unable this year (through circumstances connected with the removal of the hospital) to give a complete list of the labours in which the children were born dead. The following table, however, gives particulars of 44 cases.

Natural labour	18
Premature labour	4
Footling presentation	6
Breech presentation	3
Accidental hæmorrhage	3
Placenta prævia	2
Prolapsed funis	2
Contracted pelvis requiring forceps	2
Craniotomy	2
Convulsions	1
Drowned in a pail of water	1
	<hr/>
	44

After the cases returned as natural, in which, that is, nothing obviously abnormal was discoverable, the largest number of deaths occurred, as usual, in connection with cases of pelvic presentation, breech or footling ; but from the incompleteness of the returns I am unable this year to offer, in connection with this table, any general statistical deductions.

Of the 10 twin births, in 2 cases both were males, in 3 cases both females, and in 5 cases one child was a male and one a female.

Of the 1082 cases attended—

135 were 1st labours.	33 were 10th labours.
167 „ 2nd „	19 „ 11th „
159 „ 3rd „	12 „ 12th „
150 „ 4th „	5 „ 13th „
116 „ 5th „	2 „ 14th „
111 „ 6th „	1 was a 19th labour.
80 „ 7th „	
56 „ 8th „	<hr/>
36 „ 9th „	1082

Contrary to the experience of former years, in which the largest number of labours attended was of women in their third pregnancy, in this it has been of women in their second.

Of the 1092 children born the following table gives particulars of the presentations.

Vertex	1053
Breech	20
Footling	11
Face	5
Hand with head	2
Shoulder	1
	<hr/>
	1092

The proportion of breech cases this year closely approximates to that of last year. Last year they occurred in the proportion of 1 in every 54 labours; this year in the proportion of 1 in every 54 $\frac{1}{2}$. Of footling presentations the ratio is higher than it was last year, and nearer to Dr. Churchill's average. Last year there was but 1 case in every 250 labours; this year there has been 1 case in every 99; Dr. Churchill's average being 1 in 105.

Face presentations occurred once in 218 cases; Dr. Churchill's average being once in 231.

The number of presentations of the upper extremity has been very small, but 1 case of shoulder presentation, and 2 cases in which the hand descended with the head.

Four maternal deaths occurred during the year, or .36 per cent. Last year the number of deaths was the same, but the number of labours attended being higher, the per centage was somewhat less, being .32.

Of the 4 deaths 3 were from puerperal fever and 1 from phlegmasia dolens.

Of the 1082 cases 998 were normal, 48 were abnormal, 31 were complicated, and 5 were both abnormal and complicated.

The following tables give particulars of the more important of the last three classes. Every case had a successful result, both as regards the mother and child, unless otherwise specified.

TABLE I.—*Abnormal Cases.*

No. of case.	Cause of difficulty.	Remarks.
908	Contraction of antero-posterior diameter of brim.	O. R., æt. 24. 1st confinement. This patient had been in strong labour for 48 hours, but the head making no progress in its descent, and the abnormality of the brim being discovered, the long forceps were used, and a large male child was extracted.
1043	General contraction of the pelvis.	E. W., æt. 36. 3rd confinement. In both her previous confinements instruments had been used. The head not entering the pelvis after a protracted labour, the long forceps were used.
1163	Contraction of vaginal orifice.	J. E., æt. 24. 1st confinement. In this case, on account of the extreme rigidity of the perineum and generally unyielding character of the genital outlet, it was found necessary to make lateral incisions in the perineum, which were followed by the immediate expulsion of the head. The child made no effort at breathing when born, but after artificial respiration had been maintained for about an hour and a half animation was restored.
1309	Contraction of outlet.	S. H., æt. 29. 7th confinement. In this case the head was impacted in the pelvis for 3 hours, with the occiput posterior, and its delivery being retarded by an undue approximation of the tubera ischii, the forceps were used.
1316	Cancer of uterus.	E. P., æt. 24. 1st confinement. The attendant finding the vagina occupied by a fungous tumour impeding the labour, sent for Dr. Gervis, who found it to be a large epitheliomatous outgrowth involving the entire cervix. Dilating the cervix as much as possible, which indeed the easily friable character of the epithelioma rendered comparatively easy, Dr. Gervis endeavoured to complete the delivery first by turning, and then by the long forceps, but so much of the pelvic cavity was occupied by the diseased cervix, even after all that was safely separable had been removed, that the delivery had to be completed by craniotomy.
1326	Contraction of antero-posterior diameter of brim.	E. S., æt. 20. 1st confinement. The head not entering the pelvis after many hours' strong labour, and the woman becoming delirious, the long forceps were used.
1104	Large head, highly ossified.	E. W., æt. 30. 4th confinement. The head having rested on the perineum for two hours without making further progress, and the woman becoming exhausted, the forceps were used, and a living male child, with a large and remarkably hard head, extracted.
1802	General contraction of pelvis.	J. F., æt. 30. 3rd confinement. In both her previous labours instruments had been used; in the second of the two, craniotomy. After many hours of strong labour, the head not advancing, the long forceps were applied and a male child extracted.

No. of case.	Cause of difficulty.	Remarks.
1832	General contraction of pelvis.	S. M., æt. 30. 2nd confinement. Her last labour had occurred nine years previously. In the present one, the head being very firmly impacted in the brim, the forceps were used, and very considerable traction was required to effect the delivery.
1902	Inertia uteri.	E. L., æt. 20. 1st confinement. In this case the labour in its second stage was so prolonged, owing to the feeble character of the uterine efforts, that the woman was becoming exhausted, and the forceps had to be applied.
1932	Contraction of antero-posterior diameter of brim.	M. N., æt. 35. 7th confinement. In her last two confinements this patient had required instrumental aid. The contraction of the brim was due to some amount of spondylolisthesis. No progress being made in spite of severe pains, the long forceps were applied, and with some difficulty the head extracted. There was considerable indentation of the right parietal bone, not corresponding with the pressure of the blade of the forceps. The child breathed a few times, but ultimately died. It weighed 10 $\frac{3}{4}$ lbs.
1945	Vagina occupied by polypus.	E. J., æt. 38. 10th confinement. A polypus springing from the anterior portion of the cervix uteri by a broad base interfered with the due descent of the head, and necessitated the use of the long forceps. During the few hours which elapsed between its detection and the application of the forceps it much increased in bulk. With the descent of the head it descended also, and as the head emerged it protruded somewhat from the vulva. The woman made a good recovery, and a fortnight after her delivery the polypus had very considerably diminished in size.
2003	Inertia uteri.	E. L., æt. 37. 1st confinement. The head having been in the pelvis for 4 hours, the pains being feeble, and the woman becoming exhausted, the forceps were used.
2025	Large and highly ossified head.	H. R., æt. 38. 7th confinement. In this case, on account of the extreme hardness of the head, coupled with its unusual size, there was great difficulty in effecting delivery with the forceps, although the pelvis was capacious and well formed. By steadily sustained traction, however, a living child was ultimately extracted, and the mother suffered no ill effect, except some paralysis of the bladder, which passed off in 3 or 4 days.
2035	Inertia uteri.	M. D., æt. 39. 11th confinement. This patient was in very destitute circumstances, and the inertia was probably largely the result of inanition. Delivery was readily effected by the forceps.
2470	Contraction of antero-posterior diameter of brim.	E. W., æt. 26. 4th confinement. One previous labour, instrumental. She had been in labour for 11 hours, with the os uteri dilated for 3 hours, when, the head not entering the pelvis owing to the projection of the sacral promontory, the long forceps were used, and after considerable traction the delivery was accomplished. The patient did very well for 4 days, when symptoms of puerperal fever set in, and she sank 16 days after her confinement. Particulars are given under the head 'Maternal Deaths.'

No. of case.	Cause of difficulty.	Remarks.
2486	Generally contracted pelvis.	A. E., æt. 23. 1st confinement. After 10 hours of strong labour, with a well-dilated os, the head still remained above brim, the contraction in which necessitated the use of the long forceps. One feature of interest in this case was the unusual size of the caput succedaneum, which, with the head still above the brim, reached to the orifice of the vagina.
2487	Rigidity of soft parts.	S. E., æt. 28. 4th confinement. The head remaining at outlet of pelvis for some hours, notwithstanding strong pains, the forceps were applied. The child was born asphyxiated, but recovered by the usual means. In two previous labours the children were stillborn.
2502	Large, hard head.	H. J., æt. 32. 8th confinement. Labour pains commenced two days before delivery. After full dilatation of the os, and in spite of strong pains, the head remaining above the brim for upwards of four hours, the long forceps were used, and a large female child extracted. The head was very firmly ossified, and the occiput was posterior.
2547	Large, hard head.	M. H., æt. 36. 10th confinement. The size and hardness of the head, coupled with some inertia uteri, appeared to be the obstacles. The head, though engaged in the brim, remaining there without advance, the long forceps were used. In one previous confinement craniotomy had been resorted to.
2557	General contraction of pelvis.	M. E., æt. 28. 3rd confinement. The head being firmly impacted in the pelvis, in spite of severe and almost constant pains, the forceps were used, and a living female child extracted. On the following day symptoms of metritis set in; rigors, feverishness, abdominal swelling, with much tenderness on pressure in the hypogastric region; uterus distended and hard. P. 120. T. 102°. The uterus was at once washed out with a weak solution of the permanganate, and this, in combination with other treatment, was followed by a speedy improvement, and on the 9th day she was convalescent.
2642	Excessive size of child.	E. H., æt. 29. 4th confinement. Her second labour was instrumental, her third tedious. After being in labour for several hours, with but little result, the forceps were applied, and the head pretty readily extracted, but the difficulty with the shoulders was extreme. Mr. Addy reports that it took him an hour to extract the body after the birth of the head. The child, a male, was stillborn, and all efforts at restoration were fruitless, including the use of Dr. Richardson's apparatus; although the inflation of the lungs was well accomplished by its use, they being found on post-mortem examination to be distended, rosy red in colour, and floating perfectly. The placenta was studded with numerous calcareous nodules. The length of the child was 24 inches; breadth across shoulders 7 inches; around chest 14 inches; circumference of head 15 inches; weight 11 lbs.

TABLE II.—*Complicated Cases.*

No of case.	Nature of complication.	Remarks.
1082	Prolapsus of funis.	M. E., æt. 35. 3rd confinement. When the resident (Mr. Osborne) was called to this patient, the head was already in the pelvis, and the funis, cold and pulseless, hanging in a loop 4 in. long out of the vagina. The woman being exhausted, delivery was effected by the short forceps; the child had apparently been dead for some time.
1340	Partial placenta prævia.	F. S., æt. 37. 10th confinement. There had been considerable hæmorrhage on the setting-in of labour, and a portion of the placenta being detected projecting into the os, the membranes were ruptured, and with the advance of the head which followed the hæmorrhage ceased. The child was stillborn.
1344	Partial placenta prævia.	C. P., æt. 24. 5th confinement. The hæmorrhage in this case was also considerable, but the labour being premature (about the 6th month) and the presentation footling, as soon as the os was sufficiently dilated the labour was readily completed. The child was stillborn.
1360	Præpartum hæmorrhage.	M. W., æt. 21. 2nd confinement. For five days previously to her labour occurring there had been considerable hæmorrhage, lessened, however, by the use of astringents and local application of cold, but ceasing only when her labour set in. It was a case of footling presentation, and the child was stillborn.
1565	Post-partum hæmorrhage.	S. D., æt. 26. 3rd confinement. In this case there was considerable hæmorrhage from inertia uteri continuing for two hours after the delivery, but controlled and eventually checked by the introduction of the hand into the uterus, and pouring cold water from a height on the abdomen.
2430	Adherent placenta.	M. B., æt. 29. 2nd confinement. In this case there was very considerable uterine inertia during the labour, necessitating the use of the forceps, and when the delivery was accomplished the placenta was found to be completely adherent, and to require separation by the hand.
2527	Præpartum hæmorrhage.	A. C., æt. 27. 3rd confinement. This patient had been attending the hospital nearly up to the time of her confinement, complaining of general debility and abdominal pain. On the occurrence of some irregular labour pains, hæmorrhage had taken place, and on examination by the resident (Mr. Franklin) some hours after its first appearance, he found the os dilated to the size of a crown-piece, and its area occupied by the overlapping parietal bones of an evidently decomposed fœtus.

The woman thought herself about seven and a half months pregnant, and stated that she had not felt foetal movements for some days. Finding the hæmorrhage still continuing, Mr. Franklin determined to relieve her as speedily as practicable, and after some further dilatation of the os, and removing several more or less detached cranial bones, he was able by seizing the head under the chin to extract the remainder of the fœtus. The placenta followed, and the hæmorrhage ceased.

No. of case.	Nature of complication.	Remarks.
2111	Prolapse of funis.	M. S., æt. 30. 3rd confinement. In this case the funis presented with the head, and it was returned by the adoption of the postural method, and the child was born alive.
1892	Convulsions.	S. S., æt. 21. 1st confinement. Labour had been proceeding without making much progress for twelve hours, and accompanied by such continual vomiting that the patient becoming exhausted, it was decided to complete the delivery with the forceps. About six hours afterwards she was seized with an epileptiform convulsion, and then at short intervals with four others, each lasting about ten minutes, the fits being severe in character, and the patient in the intervals lying in a semi-unconscious condition. Late in the evening Dr. Gervis saw her, and ordered eight leeches to the temples, an ice bag to the head, a purge of croton oil and calomel, and an enema of castor oil and gruel. The leeches took well and relieved her greatly, the pulse dropping very noticeably both in frequency and force. On the following morning (July 9th) Mr. Franklin found she had had no return of the convulsions, but was still in a nearly unconscious condition. There having been no action of the bowels a drop of croton oil was administered; the application of ice, on the other hand, was continued, and she was fed simply with small quantities of milk. In the evening the croton oil was repeated, and in the course of the night a free action of the bowels took place. July 10th.—Much better; sensible; asking about her child, and recognising bystanders. Complaining of headache and sore throat and feverishness. P. 112. Tongue furred, but no return of sickness. Urine of high colour and highly albuminous. It may be mentioned that it had been noticed on the night after her delivery that the legs were oedematous; and this condition only gradually subsided. Ordered a saline mixture and chloral at bedtime. July 11th.—Passed a good night and less feverish this morning, but complains of feeling weak. Pulse feeble, 110. Tongue much cleaner. Bowels opened by a dose of castor oil. July 12th.—Still better. Pulse 100. Was ordered a tonic of ammonia and bark, and beef tea. July 14th.—On the evening of this day she had an access of pyrexia, with a furred tongue, disinclination for food, tendency to vomit and headache. Some aperient medicine, however, soon relieved her, and on the 23rd, after taking steel and digitalis for a few days, the urine was found free from albumen, and she was reported as completely convalescent.
2459	Post-partum hæmorrhage.	D. B., æt. 26. 3rd confinement. A gush of blood followed the birth of the child, and continued after the removal of the placenta. Contraction, however, was induced after clearing the uterus of clots by introducing into its cavity a piece of ice. Considerable hæmorrhage had occurred in her two previous labours.

No. of case.	Nature of complication.	Remarks.
2488	Post-partum and secondary hæmorrhage.	E. H., æt. 27. 6th confinement. Hæmorrhage first occurred six weeks before her confinement, then ceased, recurring three days before labour took place. As soon as practicable the membranes were ruptured and labour terminated naturally. The child had been dead some days. The placenta was very anæmic. Two or three days after the confinement hæmorrhage recurred, and continued for some days, but yielded ultimately to a mixture containing ergot and strychnia.
2550	Secondary hæmorrhage.	M. K., æt. 19. 1st confinement. Labour natural on Nov. 3rd. On the 14th sent to the hospital, saying she had been losing blood two or three days. Mr. Addy reports that on his arrival he found her very pale and weak, with a feeble pulse 120 in the minute. The os was about the size of a florin. After dilating the os with the hydrostatic dilator, he cleared the uterus of clots, with which it was much distended, and then injected into it the solution of perchloride of iron. There was no further loss. She complained of some "burning pain" in the lower abdomen for some three or four hours afterwards, and was feverish for some days; but there was no abdominal tenderness, and she made a good recovery. The hæmorrhage had apparently been brought on by emotion, having had a quarrel with her brother, she being unmarried.
2628	Post-partum hæmorrhage.	J. M., æt. 27. 2nd confinement. Mr. Addy reports: "Child born some time when I arrived; found it lying soaked in blood; patient still losing blood; introduced my hand into the uterus and removed the placenta, when the hæmorrhage stopped. The placenta had been retained in the uterus by contraction of the cervical portion."

TABLE III.—*Abnormal and Complicated Cases.*

No. of case.	Cause of difficulty and nature of complication.	Remarks.
1887	Inertia uteri, adherent placenta.	J. P., æt. 38. 11th confinement. The head had been in the pelvis for four hours, and the pains being very feeble, the delivery was completed by the forceps. On attempting to remove the placenta it was found to be adherent, and considerable hæmorrhage accompanied and followed its removal. Ultimately, other measures failing to induce efficient uterine contraction, the uterine cavity was injected with the solution of the perchloride of iron. The hæmorrhage then entirely ceased, and she made a good recovery.

No. of case.	Cause of difficulty and nature of complication.	Remarks.
1907	Presentation of hand with head; accidental hæmorrhage.	E. M., æt. 27. 8th confinement. Labour pains of a feeble character were said to have been going on for a fortnight when the resident accoucheur (Mr. Franklin) was sent for. On examination he found the membranes "protruding from the vagina, which they entirely filled up, like a small balloon." On rupturing them, the os being somewhat larger than half a crown, the presentation was found to consist of the left hand with the occiput. At the same time considerable hæmorrhage began to occur. The arm without much difficulty was released, and ergot given, the pains being slight, with the hope of checking the hæmorrhage. The hæmorrhage, however, continuing, it was determined to expedite the delivery, and with this object it was sought to further dilate the os by the hydrostatic dilator. This was followed by a considerable access of uterine pain, lulled for a while by opium, but within an hour active uterine efforts took place, and dilator and child, the latter though alive a very small one, were almost simultaneously expelled. The placenta followed shortly. The child survived about a quarter of an hour.
2106	Contraction of conjugate diameter; prolapse of funis; adherent placenta.	S. M., æt. 39. 2nd confinement. This was a case in which with some considerable contraction of the brim, the conjugate diameter being less than three inches, through the projection of the promontory, prolapse of the funis had occurred, and on Dr. Gervis' arrival it lay in the vagina cold and pulseless. Craniotomy was performed, and the delivery was then completed by version. The placenta was adherent at the fundus, and had to be detached. The mother made a good recovery.

Of the 22 abnormal cases recorded in the first table it will be seen, therefore, that 7 occurred among primiparæ and 15 among multiparæ. The difficulty in 2 of those occurring among primiparæ arose from a contraction of the conjugate diameter of the brain, and in one from a general contraction of the pelvis; the difficulty, however, in each case was overcome by the use of the long forceps, and in each case without the sacrifice of the child.

In one case an extreme rigidity of the vaginal outlet opposed delivery, but this speedily occurred after incising the tense border of the perineum on either side.

In two cases the forceps were required by the inadequacy of the uterine efforts; and in one craniotomy had to be

resorted to in a case where cancerous disease of the cervix had so blocked up the pelvis that it was impossible either to extract the child by the forceps or turn until its bulk was diminished.

Of the 15 among multiparæ 4 arose from general pelvic contraction, 2 from contraction of the conjugate diameter of the brain, and 1 from contraction of the transverse diameter of the outlet. But in all the timely use of the forceps sufficed to overcome the difficulty. In one of the remaining cases the difficulty arose from rigidity of the perineum and soft parts ; in another from a polypoid growth occupying in part the vagina ; and, in a third, from uterine inertia occurring in an ill-nourished woman in her eleventh confinement. In the remaining cases the difficulty was on the part of the fœtus : in four from the combined largeness and hardness of the fœtal head, and in one from the unusually large size of the whole fœtal body.

Of the 13 complicated cases 2 only occurred among primiparæ ; one of these was a case of convulsions occurring some hours after a tedious labour completed ultimately by the forceps. The patient had been previously under treatment for dropsy, and was suffering from œdema of the lower extremities at the time of her confinement. Her water was highly albuminous. The application of leeches to the temples (in combination with the other measures adopted, ice to the head, a calomel purge, and an enema) was followed by a marked improvement, and although she was seriously ill for several days she had, after the leeches, no recurrence of the fits.

The other primiparous case was one of secondary hæmorrhage occurring some days after the confinement, as a result of emotional disturbance. The loss was great, and required the intra-uterine injection of the solution of perchloride of iron for its arrest. Of the complicated cases occurring among multiparæ two were cases of partial placenta prævia ; in both the mothers recovered, but the children were stillborn. Two were cases of prolapsed funis ; in one the child was stillborn, efforts at replacing the funis having been fruitless ; in the other it was born alive, the funis having been passed within the uterus by the adoption of the postural method. There

were three cases of præpartum hæmorrhage ; in two out of the three at least the labour was premature, and in all the child was stillborn and had been evidently dead for some days.

The other cases were more or less severe ones of postpartum hæmorrhage, but in all the measures used were successful.

The three cases in which some abnormality in the labour coexisted with some complication occurred among multiparæ. In the first recorded the same inertia which during the labour necessitated the use of the forceps, continued afterwards, and, in connection with an adherent placenta, led to so great an amount of hæmorrhage that the intra-uterine injection of the perchloride of iron was needed for its arrest. In the second there was a presentation of the hand by the side of the head, and on rupturing the membranes to return the arm a gush of blood took place. The introduction of one of Dr. Barnes' bags served the treble purpose of dilating the cervix, stimulating uterine action, and checking the loss, and its expulsion by the action thus aroused was soon followed by that of the child and the placenta. In the third case there was such a contraction of the conjugate diameter of the brim as to necessitate craniotomy, resorted to less unwillingly as a loop of pulseless funis hanging out of the vagina showed that the child was dead. This case was complicated still further by an adherent placenta, which required manual extraction. The patient did well.

Towards the end of the year we had an outbreak of puerperal fever and puerperal peritonitis, which gave us much anxiety. Three died, but the greater number recovered, those, that is, in which active treatment and assiduous attention prevented the graver symptoms of general constitutional disturbance from being developed. I record one such, which occurred during the residence of Mr. Addy.

A. G—, æt. 22, was confined on December 2nd, 1871, of her first child. The labour was natural. On the

1th.—She began to complain of great pain and tenderness over the abdomen, and her pulse was 120.

5th.—Pain increased ; lochia and milk suppressed. Pulse 128 ; temp. 102°. Tongue brown but moist.

6th.—Pain less; lochia returned in a slight degree. Pulse 108; temp. $100\cdot5^{\circ}$.

7th.—General condition about the same. Pulse 120; temp. $101\cdot4^{\circ}$.

8th.—Better. Temp. $99\cdot8^{\circ}$.

9th.—Not so well. Pulse 120; temp. $101\cdot5^{\circ}$. Tenderness increased, but appears limited to left iliac region.

10th.—Better again; tenderness less. Pulse 120.

11th.—Had an attack of diarrhœa, which depressed her a good deal. Pulse 120; temp. $102\cdot2^{\circ}$.

12th.—About the same. Pulse 120; temp. $101\cdot2^{\circ}$. When the uterus was washed out this morning with the permanganate solution several flocculent shreds were brought away. 7.30 p.m.—Not so well; drowsy; severe headache; perspiring freely. Pulse 150; temp. $103\cdot8^{\circ}$.

13th.—Better. Pulse 114; temp. 100° . 8 p.m.—Worse again; feverish and thirsty. P. 156; temp. $104\cdot2^{\circ}$. Bowels relaxed, motions offensive; abdomen free from tenderness.

14th.—Better; bowels have acted twice, but motions not so loose, and less offensive. Pulse 108; temp. $99\cdot8^{\circ}$. 8 p.m.—Pulse 130; temp. $101\cdot4^{\circ}$.

15th.—Worse; skin very hot. Pulse 134; temp. $103\cdot4^{\circ}$. tongue dryish; bowels loose. 8.45 p.m.—Better; skin moister; less thirst and headache. Pulse 120; temp. $103\cdot6^{\circ}$.

16th.—Fair night; feels much better; skin moist and cool; tongue cleaner and moist. Pulse 100; temp. $98\cdot2^{\circ}$ —a fall since last night of $5\cdot4^{\circ}$.

From this date she continued slowly to improve; but an attack of bronchitis occurring some ten days afterwards, again prostrated her. She was admitted into Adelaide, and ultimately left well. The treatment adopted consisted in counter-irritation and fomentations over the lower abdomen, the systematic washing-out of the uterus with a lotion consisting of ʒj of Condyl's fluid to a pint of water. In the febrile stage the saline anodyne mixture, the amount of anodyne varying with circumstances; in the latter ammonia and bark; in all more or less generous support, with beef tea and wine or brandy.

The difference in the thermometric readings of the early and late visits during the more unfavorable days of her illness

is of considerable interest. There were several less serious cases, in which the local malady did not attain the importance it did in the case just narrated, and in which the constitutional disturbance was proportionately less marked.

I may mention that, on the occurrence of any case in which there was even a suspicion of puerperal trouble, the attendant at once gave up attendance on any other case, and when the graver cases occurred the resident accoucheur was freed by the appointment of a temporary substitute from all responsibility but that of watching them. The following are the particulars of the four cases which ended fatally.

A. B—, æt. 31, was confined of her sixth child on October, 16th, 1871. The labour was attended with a rather severe hæmorrhage, but it was controlled by the usual means, and when the attendant left the uterus was fairly contracted. On the 18th, some hæmorrhage having occurred, the resident finding the uterus large, introduced his hand to clear out the clots and felt the projection into its cavity of what he thought, and, perhaps, correctly, to be a fibroid tumour; for at her previous labour she had had much hæmorrhage and the periods were always attended with a great loss.

20th.—Feverish; skin hot; lochia offensive; pulse 120.

22nd.—Vagina found on examination to be excoriated and inflamed; some abdominal tenderness.

23rd.—Better; no abdominal tenderness.

25th.—Better.

27th.—Worse; face flushed; tongue brown and furred. Pulse 120; temp. $102^{\circ}6'$; respiration 44.

28th.—Delirious during night. Muttering this morning. Cough still troublesome, and much sibilant rhonchus over chest. Urine passed unconsciously; bowels confined. Pulse 134; temp. $103^{\circ}4'$; respiration 40. No abdominal tenderness.

29th.—Apparently moribund. Incessantly screaming in a distressing manner.

30th.—A little better, quieter. Had slept and taken nourishment. Sordes on lips.

31st.—Much the same. Pulse 140; temp. 103° ; respiration 44.

November 1st.—Temp. $103\cdot7^{\circ}$; respiration 48. Sordes on lips; passes urine unconsciously.

2nd.—Almost unconscious. Some return of abdominal tenderness. No cough or expectoration; refuses nourishment. Pulse 160. She died quietly at 10 p.m.

A. R—, æt. 23, was delivered of her third child on November 25th, 1871. The labour was completed, and the child, a male, born alive some time before the arrival of the obstetric clerk. The placenta was readily removed from the vagina, and there was no hæmorrhage. Went on well until the 29th, when in the afternoon she was attacked with vomiting. Mr. Addy saw her in the evening and found there was some little abdominal tenderness, that the secretion of milk and lochia were diminished, and that the latter were offensive. The tongue furred, and the pulse 130, and feeble.

30th, 9 a.m.—Vomiting of green biliary matter continues. Bowels open twice, motions pale. Pulse 140; temp. 101° . 3.15 p.m., abdomen more tense and becoming tympanitic. Vomiting continues. 9.30 p.m.—No sickness since 6 p.m.

December 1st.—Slept fairly at intervals. No more vomiting. Pulse 120 and stronger; temp. 102° (axilla), $104\cdot5^{\circ}$ (vagina). Abdomen less full, and but slightly tender; there are some signs of a return of milk and of lochial discharge.

2nd.—Slept at intervals during the night, but wandered somewhat. Some vomiting again; some headache. Pulse 140, feeble; temp. $101\cdot8^{\circ}$ (axilla); $103\cdot8^{\circ}$ (vagina). Tongue furred but moist. No complaint of abdominal tenderness. Secretion of milk and lochia again receded. 10 p.m.—Patient sinking. Pulse 160, extremely feeble; respirations gasping, about 30. Extremities cold; conscious but irritable.

3rd.—Died about 10 a.m. this morning. Her husband stated that she has never been strong since her marriage, and her mother that for six weeks after her previous confinement she was very ill, and then had constant vomiting. The case was of the adynamic type throughout, the pulse being extremely feeble from the beginning to the end of her illness. There was no marked abdominal or uterine tenderness.

E. W—, æt. 26, was delivered in her fourth confinement of

a living male child, November 13, 1871. The labour was a difficult one on account of a diminution in the conjugate diameter of the brim, and had to be completed instrumentally; her last labour had also been instrumental. The placenta followed naturally, and the uterus contracted well and without hæmorrhage. She went on very satisfactorily until the 17th (four days after her confinement), when she complained of sharp pains in the abdomen and thighs, with uterine tenderness on pressure, a pulse of 120, a temperature of 102° , and a furred tongue. In a couple of days, however, under the usual treatment these symptoms had all subsided and she appeared to be going on favorably, although still very weak. On the 25th she had a severe attack of diarrhœa.

26th.—Diarrhœa better; appetite bad; tongue cleaner and moist; troublesome lachrymation.

27th.—Not so well; was delirious in the night. Tongue dry and brown. P. 130; T. 103.4° . Respirations short and frequent; some cough; lochia suppressed.

28th.—Had another sharp attack of diarrhœa; no vomiting; abdomen somewhat tympanitic. 4.30 p.m.—Sinking. Resp. 60; scarcely able to take any nourishment, and died about 5 a.m. on the 29th (the sixteenth day after her confinement).

It was stated by her friends that she had been in a very weak state previous to her confinement.

The last maternal death that has to be recorded resulted from phlebitis.

C. S—, æt. 31, was confined of her fifth child on November 19, 1871. Labour natural and easy; no hæmorrhage. She went on quite well until the 24th, when she complained of slight pain in one elbow, and on the 25th complained of pain in the calf of the left leg.

26th.—Tongue brown and dry; sordes on lips and teeth. Calf of left leg much swollen; very hard, whitish, tense and painful. No tenderness in abdomen or groin, and very little, if any, along femoral vein.

27th.—Much worse. Leg much swollen, and of a livid hue. One large and two or three small bullæ formed on posterior part of calf, which, on being punctured, let out a

large quantity of serum deeply tinged with blood. Pulse imperceptible ; T. 103.4° ; wandering delirium. She died in the afternoon. Her friends said she had been ill for the last six months ; had eaten very little during that time, and was very desponding about her approaching confinement.

MEDICAL REPORT.

1871.

By S. E. SOLLY, F.R.C.S.,
MEDICAL REGISTRAR TO THE HOSPITAL.

TABLE I.—*General Statement.*

	Males.	Females.	Total.
Number of patients in medical wards January 1st	38	36	74
Admitted during the year . . . . .	...	...	713
In medical wards December 31st	90	96	186
Discharged during the year	404	383	787

Summary of Results.

Cases discharged.	Number of cases.		Total.	Proportion per cent.
	Males.	Females.		
Cured	133	143	277	35.1
Relieved	157	152	309	39.2
Unrelieved, or for other causes	30	36	66	8.4
Died	99	49	148	18.8

Average number of patients in medical wards daily during the year, 73.8.

Mean duration of residence in hospital, 34.24 days.

TABLE II.

DISEASE.	Total number of cases.	Number of cases.		Age.		Average duration of residence.	Cases discharged.				Average rate of mortality.
		Males.	Females.	Youngest.	Oldest.		Cured.	Relieved.	Not rel'd. or fr. other causes.	Died.	
GENERAL DISEASES—											
Scarlatina	2	...	2	6	29	38.5	2	...	...	...	...
Rubeola	6	3	3	1	6	20.5	3	...	...	3	50
Variola	26	18	8	6	40	51.2	21	...	1	4	16
Typhus	2	1	1	22	27	46	2	...	...	...	...
Febricula	4	2	2	17	39	16.5	4	...	...	...	...
Rotheln	1	1	...	19	19	21	1	...	...	...	...
Enteric	18	9	9	10	34	44.5	16	...	...	2	11
Ague	6	6	...	15	60	22.5	5	1	...	...	...
Diphtheria	1	1	...	19	19	6	...	...	...	1	100
Pertussis	1	1	...	2 $\frac{1}{2}$	2 $\frac{1}{2}$	1	...	...	1	...	...
Erysipelas	4	3	1	29	56	22.5	4	...	...	...	...
Pyæmia	1	1	...	48	48	2	...	...	...	1	100
Rheumatism	120	62	58	11	70	22.03	81	37	1	1	0.8
Gout	6	6	...	24	67	47.5	1	4	...	1	17
Syphilis	19	13	6	21	56	49.5	4	12	3	...	...
Cancer	16	3	13	23	58	61.5	...	2	4	10	63
Phthisis	76	54	22	11	61	35.5	1	42	1	32	42.1
Tubercular meningitis	1	1	...	37	37	8	...	...	...	1	100
Rachitis	1	1	...	9	9	15	...	1	...	...	...
Diabetes	7	5	2	16	63	47	...	2	1	4	49.1
Anæmia	22	5	17	3 $\frac{1}{2}$	41	26.9	17	5	...	...	...
Anasarca simplex	4	2	2	30	62	55	...	4	...	...	...
DISEASES OF NERVOUS SYSTEM—											
Cerebral	13	11	2	2	70	20.2	...	4	...	9	69.2
Hemiplegia	22	10	12	14	69	52.6	3	11	3	5	22.7
Paraplegia	7	4	3	5	58	103.9	...	3	...	4	57.1
Locomotor ataxy	9	8	1	22	65	44.9	...	8	1	...	...
Local paralysis	2	1	1	12	58	39	2	...	...	...	...
Epilepsy	15	8	7	8	50	19.8	2	12	1	...	...
Paralysis agitans	4	1	3	30	60	43	...	3	1	...	...
Chorea	16	4	12	7	19	42.2	10	5	1	...	...
Hysteria	9	...	9	16	70	11.3	2	6	1	...	...
Hypochondriasis	3	3	...	38	23	20.3	...	2	1	...	...
Sciatica	3	1	2	25	71	92.3	...	3	...	...	...
Neuralgia	1	...	1	25	25	34	...	1	...	...	...
General paralysis	1	1	...	31	31	10	...	...	1	...	...
Mania	1	...	1	27	27	15	...	...	1	...	...
Concussion	1	1	...	25	25	84	...	1	...	...	...

TABLE II—*continued.*

DISEASE.	Total number of cases.	Number of cases.		Age.		Average duration of residence.	Cases discharged.				Average rate of mortality.
		Males.	Females.	Youngest.	Oldest.		Cured.	Relieved.	Not relieved from other causes.	Died.	
DISEASES OF CIRCULATORY SYSTEM—											
Cardiac valvular	46	25	21	13	71	33·6	1	22	...	23	50
Functional derangement	4	3	1	22	48	24·2	...	3	1	...	...
Aneurism	1	1	...	64	64	11	...	...	1	...	...
Embolism	1	1	...	29	29	6	...	...	...	1	100
Thrombosis	1	...	1	26	26	4	...	...	...	1	100
Phlebitis	1	...	1	26	26	11	...	1	...	...	...
DISEASES OF DUCTLESS GLANDS—											
Exophthalmic goitre	1	...	1	36	36	46	...	...	1	...	...
Goitre	1	...	1	46	46	32	...	1	...	...	...
DISEASES OF RESPIRATORY SYSTEM—											
Laryngitis	1	...	1	40	40	11	...	1	...	...	...
Bronchial catarrh	5	2	3	2	70	25·1	2	3	...	...	...
Bronchitis	52	38	14	16	70	27·9	18	19	1	14	26·9
Asthma	1	1	...	32	32	2	...	1	...	...	...
Pneumonia	22	17	5	11	62	19·5	13	2	...	7	31·8
Pleurisy	5	5	...	22	49	42	4	1	...	...	...
Empyema	2	2	...	5	28	78	1	1	...	...	...
DISEASES OF DIGESTIVE SYSTEM—											
Cynanche	4	...	4	18	29	10·9	3	1	...	...	...
Stricture of œsophagus	1	1	...	55	55	40	...	1	...	...	...
Gastric ulcer	2	...	2	23	28	27·5	1	1	...	...	...
Hæmatemesis	5	2	3	25	55	38·2	2	1	1	1	20
Dyspepsia	24	6	18	2	56	22·04	14	9	1	...	...
Pyrosis	1	1	...	30	30	8	1	...	...	...	...
Vomiting	1	...	1	43	43	20	1	...	...	...	...
Dysentery	4	4	...	28	57	42·7	2	1	...	1	25
Diarrhœa	2	1	1	3	70	30·5	1	1	...	...	...
Colic	5	...	5	5	50	19	1	2	2	...	...
Constipation	1	1	...	28	3	28	...	...	...	1	100
Hepatic enlargement	7	6	1	34	54	24·5	1	1	...	5	70·7
Icterus	3	2	1	15	32	20	2	1	...	...	...
Hydatid abscess	2	...	2	31	31	29	...	2	...	...	...
Gall-stones	2	1	1	20	52	38·5	...	2	...	...	...

TABLE II—*continued.*

DISEASE.	Total number of cases.	Number of cases.		Age.		Average duration of residence.	Cases discharged.				Average rate of mortality.
		Males.	Females.	Youngest.	Oldest.		Cured.	Relieved.	Not rel'd or fr. other causes.	Died.	
DISEASES OF URINARY SYSTEM—											
Albuminuria . . .	27	21	6	8	59	29·9	5	13	1	8	29·7
DISEASES OF GENERATIVE SYSTEM (FEMALE)—											
Ovarian dropsy . .	3	...	3	25	56	170·3	...	3	...	...	...
„ tumour . . .	3	...	3	24	29	11·7	...	1	2	...	...
Pelvic peritonitis .	4	...	4	20	36	46·2	...	2	1	1	25
„ abscess . . .	1	...	1	33	33	103	1	...	...	...	...
Endometritis . . .	2	...	2	35	41	187	...	2	...	...	...
Hypertrophy of os .	1	...	1	34	34	107	...	1	...	...	...
Ulceration of os . .	2	...	2	23	27	285	1	1	...	...	...
Contraction of os .	12	...	12	19	28	37·7	5	6	1	...	...
Uterine tumour . .	6	...	6	26	46	41·8	...	2	3	1	16·7
„ hydatid . . .	1	...	1	46	46	35	...	1	...	...	...
„ polypus . . .	3	...	3	36	50	49	2	1	...	...	...
Retroversion . . .	6	...	6	24	43	32·5	...	6	...	...	...
Antroflexion . . .	1	...	1	28	28	32	...	1	...	...	...
Retroflexion . . .	4	...	4	26	43	40·5	...	2	2	...	...
Prolapsus	2	...	2	52	74	68	...	2	...	...	...
Vaginal abscess . .	1	...	1	21	21	72	1	...	...	...	...
Vesico-vaginal . .	1	...	1	29	29	167	1	...	...	...	...
Amenorrhœa . . .	2	...	2	20	24	36	2	...	...	...	...
Vicarious menstruation . .	2	...	2	22	27	14·5	2	...	...	...	...
Dysmenorrhœa . .	1	...	1	26	26	13	1	...	...	...	...
Menorrhagia . . .	5	...	5	15	54	30·2	1	3	...	1	20
Retention of urine, post-partum . .	1	...	1	35	35	22	...	...	1	...	...
Abortion	1	...	1	39	39	28	1	...	...	...	...
Pregnancy	1	...	1	24	24	175	1	...	...	...	...
Abdominal tumour .	1	...	1	52	52	2	...	...	...	1	100
DISEASES OF ORGANS OF LOCOMOTION—											
Muscular atrophy .	2	2	...	20	28	77	...	2	...	...	...
Abscess of sacro-iliac joint	1	...	1	34	34	51	...	...	1	...	...
DISEASES OF SKIN .	7	1	6	9	63	42	3	4	...	...	...
POISONS	8	5	3	5	66	23·7	3	5	...	...	...
SURGICAL	16	10	6	...	...	...	...	...	...	...	...
VARIOUS	10	5	5	2	49	10·6	...	...	10	...	...
UNREPORTED . . .	5	...	5	...	...	22·8	...	...	...	...	...

VARIOLA.

Twenty-six Cases—23 at Newington and 3 at Stangate.

At Newington twelve (Nos. 10, 11, 12, 13, 4 F., 7 F., 3, 16, 9 F., 5 F., 6 F., 19) were admitted during period of incubation, of whom five were persons working in the wards of the hospital (viz., Nos. 10, 11, 12, 4 F., and 7 F.).

No. 3 had symptoms of acute pulmonary congestion.

No. 9 F. complained of severe sacral pain, ascribed to a fall.

No. 16 had variolous symptoms developed, but was admitted because of self-inflicted bullet wound.

Nos. 5 F., 6 F., 13, 19, had obscure febrile symptoms.

Eleven cases (Nos. 5, 6, 7, 8, 9, 4, 14, 15, 17, 18, 8 F.) took the disease while under treatment for other causes.

Of these, Nos. 5, 6, 7, 8, 9, were infected by the admission into the same ward (Edward) of No. 3, the first case of variola.

No. 4 was also infected by No. 3 while with him in casualty ward.

The direct cause of infection in the five remaining cases was not so readily traced.

Of the three cases (Nos. 9 A. 1 F., 9 A. F., 19 A.) at Stangate, No. A. 1 F. was under treatment in hospital; the other two (Nos. 9 A. F. and 19 A.) were admitted direct into the fever wards.

Non-Vaccination.

Three (7, 9 A. 1 F., 14). Two died.

Infantile Vaccination.

Twenty-three. Three had no marks (11, 4 F., 5 F.). Five had good marks (4, 17, 18, 6 F., 8 F.). (3, 5, 8, 9, 10, 12, 13, 15, 16, 19, 19 A., 4 F., 7 F., 9 F., 9 A. F.), two of whom (13 and 19 A.) died.

Re-Vaccination since Puberty.

Eight. Five (8, 12, 4 F., 6 F., 8 F.) had re-vaccination marks. Two unsuccessful (5, 9). One (11) was successfully re-vaccinated eight days before the eruption, which was semi-confluent, appeared.

Fatal Cases.

Four. Two (7, 14) had no evidence of vaccination; one of these was much exhausted by diabetes; the other was a lad with fractured femur. Death in both cases on the seventh day. The other two (13, 19 A.) had imperfect infantile marks. 13 died on the seventh day. 19 A. on the ninth day.

In all four there was much pyrexia and full eruption.

In the whole twenty-six cases the eruption was modified except 7 and 14, in whom it was confluent; eight were semi-confluent and the rest discrete, in six of whom there was no scabbing. There was sacral pain in 13 cases. In the case of diabetes the amount of sugar in urine remained the same.

ENTERIC FEVER.

Eighteen Cases.

Two fatal (28, 19 F.). 28 had diarrhœa and rash for 14 days previous; had been dosed with mercury for chancre. 19 F., no diarrhœa or rash, congestion both lungs, previously weak and over-worked.

In both ulceration of ilium.

Non-Fatal.

In two no rash. In four no diarrhœa. In six no abdominal tenderness.

RHEUMATISM.

One hundred and twenty Cases.

Thirty-nine acute cases, in twenty of whom pericarditis, and in two of these pleurisy as well. Thirty-six subacute.

SURGICAL REPORT.

1871.

By W. ANDERSON, F.R.C.S.,
SURGICAL REGISTRAR TO THE HOSPITAL.

TABLE I.—*General Statement.*

Number of patients in hospital January 1st, 1871	116
„ admitted during the year	1077
„ under treatment	1193
„ discharged cured	546 = 59·8 per cent.
„ „ relieved	187 = 20·4 „
„ „ unrelieved	51 = 5·9 „
„ „ for special reasons	50 = 5·4 „
„ died	76 = 8·3 „
„ treated to a termination during 1871	913
„ remaining in the hospital Dec. 31st, 1871	280
	1193
Males discharged	603
Females „	307

Average duration of treatment 45·8 days.

	TOTAL.		AGES.										RESULT.					Average stay in Hospital in days.
	M.	F.	5	10	15	20	30	40	50	60	+	C.	R.	U.	S.	D.		
GENERAL DISEASES—																		
Chronic gout . . .	1	...	...	...	...	...	...	...	...	...	1	1	...	...	...	...	54
Syphilis . . .	10	8	...	...	...	2	7	5	3	1	...	9	8	...	...	1	53
Cancer—																		
<i>a. Scirrhus—</i>																		
Of breast . . .	...	5	...	...	...	...	...	...	1	3	1	2	1	...	1	1	31
Of parotid . . .	1	...	...	...	...	...	...	...	1	...	...	...	...	1	...	...	12
Of large intestine .	3	...	...	...	...	...	...	...	1	...	2	...	1	1	...	1	111
Of skin of hand . .	...	1	...	...	...	...	...	1	...	...	...	...	...	...	1	...	7
<i>b. Medullary—</i>																		
Of sup. maxilla . .	1	...	...	...	...	...	...	...	1	...	...	...	...	...	...	1	111
Multiple growths .	1	...	...	...	1	...	...	...	...	...	...	...	...	...	...	1	16
<i>c. Epithelial—</i>																		
Of lips . . .	2	...	...	...	...	...	...	...	1	1	2	...	...	...	...	...	21
Of tongue . . .	3	2	...	...	...	...	...	...	3	2	...	...	1	3	1	...	45
Of penis . . .	2	...	...	...	...	...	...	...	1	...	1	1	...	1	...	...	32
LOCAL DISEASES—																		
<i>Non-malignant Tumours—</i>																		
<i>a. Fibrous . . .</i>																		
Of neck . . .	...	2	...	...	...	...	...	...	1	1	...	...	1	1	...	...	7
<i>b. Fatty . . .</i>																		
Of breast . . .	3	2	...	...	...	...	1	...	1	2	1	3	...	...	2	...	12
<i>c. Glandular—</i>																		
Mammary . . .	...	1	...	...	...	1	...	...	...	...	...	1	...	...	...	...	46
d. Naevus . . .	2	1	1	...	...	2	...	...	...	...	...	2	...	...	1	...	30
<i>e. Cystic, compound—</i>																		
Ovarian . . .	...	2	...	...	...	...	2	...	...	...	...	...	...	...	1	1	19
<i>f. Sarcoma—</i>																		
<i>Spindle-celled—</i>																		
Of neck . . .	...	1	...	...	...	...	...	...	...	1	...	1	...	...	...	...	30
Of breast . . .	...	1	...	...	...	...	...	...	...	1	...	...	...	1	...	...	101
<i>Round-celled—</i>																		
Of skin, melanotic .	...	1	...	...	...	...	1	...	...	...	...	1	...	...	...	...	49
Of ball of thumb .	...	1	...	...	1	...	...	...	...	...	...	...	1	...	...	...	5
Of lower jaw . . .	3	1	...	...	...	...	...	3	1	...	...	1	...	3	...	...	23
<i>Fasciculated—</i>																		
Of tibia . . .	1	...	...	...	...	1	...	...	...	...	...	...	1	...	...	...	20
<i>Myeloid—</i>																		
Of metacarp. bone .	1	...	...	1	...	...	...	...	...	...	...	...	...	...	1	...	10
<i>g. Undetermined .</i>																		
Lupus . . .	...	1	...	...	...	...	...	...	...	...	1	...	...	1	...	...	26
Rodent ulcer . . .	...	1	1	...	...	...	...	...	...	...	...	...	1	...	...	...	21
Of . . .	1	...	...	...	...	...	...	...	1	...	...	1	...	...	...	...	93
<i>Dis. of Nervous System—</i>																		
Maltorm. (spina bifida)	1	...	1	...	...	...	...	...	...	...	...	...	1	...	...	...	75
Local paralysis . .	...	1	...	...	...	...	...	...	...	1	...	...	...	1	...	...	10
Tetanus (admitted) .	3	...	...	...	1	...	1	1	...	...	...	1	...	...	...	2	15
Neuralgia . . .	1	2	...	...	...	...	...	3	...	...	...	1	1	1	...	...	20
Muscular spasm . .	1	...	...	...	...	...	...	...	1	...	...	...	...	1	...	...	52
Delirium tremens . .	1	...	...	...	...	...	...	1	...	...	...	1	...	...	...	...	19
Mania . . .	1	...	...	...	...	...	...	...	1	...	...	...	...	1	...	...	15

	TOTAL.		AGES.										RESULT.					Average stay in Hospital in days.
	M.	F.	5	10	15	20	30	40	50	60	+	C.	R.	U.	S.	D.		
<i>Eye—</i>																		
Conjunctiva—																		
Granular ophthalmia	2	1	...	...	...	1	1	...	...	...	1	1	1	1	...	...	15
Cornea—																		
Keratitis . . .	1	1	...	...	...	1	1	...	...	...	...	1	1	...	...	...	49
Ulcer . . .	2	3	1	2	1	...	1	...	...	...	...	1	4	...	...	...	51
Pannus . . .	...	1	...	...	...	1	...	...	...	...	...	...	...	1	...	...	32
Staphyloma . . .	...	1	...	...	...	...	...	1	...	...	...	...	1	...	...	...	22
Optic nerve—																		
Optic neuritis . .	1	...	...	...	...	1	...	...	...	...	...	...	...	1	...	...	103
Atrophy of disc . .	1	1	...	...	...	...	...	...	2	...	...	...	...	2	...	...	9
Lens—																		
Cataract . . .	5	9	...	4	...	...	...	2	2	1	5	2	6	6	...	...	49
Eyelids—																		
Entropium . . .	1	...	...	...	...	...	...	...	1	...	...	...	1	...	...	...	56
Within orbit—																		
Strabismus . . .	1	1	...	1	...	1	...	...	...	...	...	2	...	...	...	...	16
<i>Circulatory System—</i>																		
Arteries—																		
Aneurism . . .	2	1	...	...	...	2	1	...	...	...	...	2	...	...	...	1	47
Veins—																		
Phlegmasia dolens .	...	1	...	...	...	...	1	...	...	...	...	...	...	...	...	1	8
Varix . . .	2	4	...	...	...	1	...	3	1	1	...	3	3	...	...	...	28
Hæmorrhage (admitted)	2	...	...	...	...	...	1	1	...	...	...	2	...	...	...	...	4
<i>Absorbent System—</i>																		
Indurated glands .	4	1	...	...	...	...	1	1	2	...	1	2	3	...	...	...	71
Lymphadenoma . .	...	2	...	...	...	...	2	...	...	...	...	...	...	...	2	...	24
<i>Respiratory System—</i>																		
Croup . . .	1	...	1	...	...	...	...	...	...	...	...	...	...	...	...	1	1
Consolidation of lung	1	...	...	...	...	...	...	...	1	...	...	1	...	...	...	...	55
<i>Digestive System—</i>																		
Lips—																		
Harelip . . .	1	1	1	1	...	...	...	...	...	...	...	2	...	...	...	...	36
Fissure . . .	1	...	...	...	...	...	1	...	...	...	...	1	...	...	...	...	3
Palate—																		
Cleft palate . . .	2	3	1	2	1	...	1	...	...	...	...	1	3	1	...	...	29
Perforation . . .	1	...	...	...	...	...	...	1	...	...	...	...	...	1	...	...	8
Œsophagus—																		
Stricture . . .	1	...	...	...	...	...	1	...	...	...	...	...	...	...	1	...	9
Intestines—																		
Hernia—																		
Reducible . . .	1	...	...	...	...	...	1	...	...	...	...	...	1	...	...	...	70
Irreducible . . .	...	2	...	...	...	...	...	1	...	1	...	...	2	...	...	...	30
Strangulated—																		
Inguinal . . .	7	1	...	...	...	...	1	3	2	...	2	4	1	...	...	3	20
Femoral . . .	1	10	...	...	...	...	...	...	3	5	3	8	...	...	...	3	31
Umbilical . . .	...	1	...	...	...	...	...	1	...	...	...	...	...	...	1	...	2
Stricture of rectum	2	3	...	...	...	1	4	...	...	...	...	1	4	...	...	...	45
Malformation . . .	...	1	1	...	...	...	...	...	...	...	...	...	...	...	...	1	5
Anus—																		
Fistula . . .	5	1	...	...	...	...	1	3	...	2	...	3	1	...	1	1	33
Hæmorrhoids . . .	2	1	...	...	...	...	...	1	...	1	1	2	1	...	...	...	29
Prolapse . . .	...	1	1	...	...	...	...	...	...	...	...	...	...	1	...	...	6
Spasm of sphincter .	...	1	...	...	...	...	...	...	1	...	...	...	1	...	...	...	18

	TOTAL.		AGES.								RESULT.					Average stay in Hospital in days.		
	M.	F.	5	10	15	20	30	40	50	60	+	C.	R	U	S.	D.		
<i>Genito-urinary System—</i>																		
Bladder—																		
Vesico-intest. fistula .	1	...	...	...	...	...	...	...	1	...	...	...	...	...	...	1	25
Calculus . . .	7	...	1	1	...	...	4	...	...	1	4	3	...	...	...	...	43
Hæmaturia . . .	4	...	...	...	...	...	2	1	1	...	2	1	...	...	...	1	13
Malformation . . .	1	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	101
Irritability . . .	5	...	...	...	...	1	3	1	...	...	...	1	1	...	3	...	26
Painful micturition .	1	1	...	...	...	...	1	1	...	...	...	...	1	1	...	...	9
Incontinence of urine	...	1	...	1	...	...	...	...	...	...	...	1	...	...	...	...	34
Retention of urine .	1	1	...	...	...	...	1	...	...	1	2	...	...	...	...	...	11
Prostate, enlargement .	1	...	...	...	...	...	...	...	...	1	...	...	...	...	...	1	8
Prepuce—																		
Phimosis . . .	4	...	1	1	1	1	...	...	...	...	...	3	1	...	...	...	12
Urethra—																		
Stricture . . .	39	...	...	...	...	1	9	10	12	4	3	24	9	...	...	6	38
Malformation . . .	1	...	1	...	...	...	...	...	...	...	...	...	...	1	...	...	29
Testes and cord—																		
Orchitis . . .	2	...	...	...	...	1	...	1	...	...	...	1	1	...	...	...	20
Hydrocele . . .	7	...	...	...	...	1	3	1	...	1	1	3	1	3	...	...	34
Varicocele . . .	1	...	...	...	...	1	...	...	...	...	...	1	...	...	...	...	16
Vagina—																		
Vesico-vaginal fistula	...	2	...	...	...	...	1	1	...	...	...	1	...	1	...	...	36
Vulva—																		
Inflammation . . .	...	1	...	...	...	1	...	...	...	...	...	...	...	...	1	...	6
Female breast—																		
Abscess . . .	...	1	...	...	...	...	1	...	...	...	...	1	...	...	...	...	32
<i>Organs of Locomotion—</i>																		
Bones—																		
Periostitis . . .	3	1	...	1	1	...	...	2	...	...	...	2	2	...	...	...	56
Caries and necrosis—																		
a. Cranial bones . . .	2	...	...	1	...	...	1	...	...	...	...	1	1	...	...	...	120
b. Lower jaw . . .	...	1	...	...	1	...	...	...	...	...	...	1	...	...	...	...	22
c. Clavicle . . .	1	...	...	...	1	...	...	...	...	...	...	1	...	...	...	...	85
d. Humerus . . .	1	1	1	1	...	...	...	...	...	...	...	1	1	...	...	...	86
e. Ulna and radius .	1	2	...	1	1	...	1	...	...	...	...	1	2	...	...	...	36
f. Bones of hand . .	1	4	...	...	1	1	1	1	1	...	...	4	1	...	...	...	27
g. Pelvic bones . . .	1	2	...	...	1	...	1	1	...	...	...	...	...	1	...	2	115
h. Femur . . .	8	1	...	...	7	1	1	...	...	...	...	1	6	...	1	1	103
i. Patella . . .	1	...	...	1	...	...	...	...	...	...	...	1	...	...	...	...	71
j. Tibia . . .	5	3	...	3	3	...	...	2	...	...	...	5	3	...	...	...	58
k. Fibula . . .	1	...	...	...	...	1	...	...	...	...	...	1	...	...	...	...	66
l. Bones of foot . .	2	3	...	...	...	1	1	2	1	...	...	1	3	...	1	...	120
Joints—																		
Acute synovitis . . .	1	7	...	...	...	2	3	3	...	...	...	7	1	...	...	...	46
Chronic synovitis . .	1	...	...	...	...	1	...	...	...	...	...	1	...	...	...	...	33
Ankylosis—																		
a. Elbow . . .	1	1	...	...	1	...	...	1	...	...	...	2	...	...	...	...	83
b. Hip . . .	...	1	...	...	1	...	...	...	...	...	...	...	...	...	...	1	45
c. Knee . . .	...	1	...	...	...	...	1	...	...	...	...	...	...	1	...	...	18
Abscess . . .	...	2	...	...	1	...	...	1	...	...	...	2	...	...	...	...	89
Dropsy . . .	...	1	...	...	...	...	...	1	...	...	...	1	...	...	...	...	68
Loose cartilages . .	1	...	...	...	...	...	1	...	...	...	...	1	...	...	...	...	6
Other diseases—																		
a. Elbow . . .	1	1	...	...	...	...	1	...	...	1	...	1	...	1	...	1	47

	TOTAL.		AGES.										RESULT.					Average stay in Hospital in days.
	M.	F.	5	10	15	20	30	40	50	60	+	C.	R.	U.	S.	D.		
<i>Organs of Locomotion</i> (continued)—																		
b. Wrist	1	1	.....			1	.....		1	.....		2	.....				156
c. Sacro-iliac syn- chondrosis . . . . .	...	1	.....			1	.....			.....			1	.....			36
d. Hip	13	10	1	7	5	4	4	2	.....			2	13	2	4	2	90
e. Knee	19	17	3	7	3	4	13	4	1	1	...	15	9	6	3	3	107	
f. Ankle	7	...	1	3	.....	2	...	1	.....			6	.....		1		79
g. Tarsus, &c.	4	3	2	.....		1	2	...	2	...		1	4	...	1	1	112
Spine—																		
Caries	2	5	1	2	.....	3	1	.....				1	...	3	3		46
Angular deformity	1	...				1	.....					1	.....				55
Tendons and fasciæ—																		
Contraction of fasciæ	1	...							1	.....		1	.....				105
Club-foot—																		
a. Talipes varus . . . . .	...	1	1	.....										1	...		108
b. „ equinus . . . . .	...	1	...	1	.....									1	...		180
c. „ equino-varus . . . . .	...	1	1	.....								1	.....				73
Wry neck	2	...			2	.....						2	.....				117
Appendages of the mus- cular system—																		
Enlarg. bursa patellæ	1	4	.....			2	3	.....				5	.....				34
„ bursa over gt. trochanter	1	...					1	.....				1	.....				57
„ bursa over ankle	1	...							1	.....		1	.....				18
Inflamed bursa . . . . .	...	1	.....		1	.....						1	.....				14
Bursal abscess	1	6	.....			4	1	1	1	...		7	.....				26
Malformation	1	...						1	.....			1	.....				36
<i>Cellular Tissue—</i>																		
Abscess	22	12	2	5	3	4	10	4	4	2	...	18	8	2	4	2	45	
Sinus	5	1	.....		1	1	1	1	1	1	...	3	2	1	...		78
<i>Cutaneous System—</i>																		
Erythema	3	...			1	...	1	.....		1	3	.....					29
Psoriasis . . . . .	...	1	.....						1	.....				1	...		7
Eczema	3	2	.....				1	...	1	1	2	2	3	.....			29
Superficial sloughs	1	...									1	1	.....				31
Ulcers—																		
a. Healthy	1	...								1	...	1	.....				77
b. Weak . . . . .	...	1	.....			1	.....					1	.....				45
c. Inflamed	3	1	...		1	...			2	...	1	3	...	1	...		20	
d. Indolent	14	4	1	2	...		2	6	2	2	3	15	3	...			56	
e. Chronic . . . . .	...	1	.....								1	...	1	.....			6
f. Irritable . . . . .	...	1	...		1	...						1	.....				29
g. Sloughing	4	...					1	1	1	...	1	2	2	...			163	
h. Strumous . . . . .	...	4	...		2	...		1	1	...		3	...	1	...		42
i. Varicose . . . . .	...	1	.....				1	...				1	.....				53
Carbuncle	2	3	.....						2	2	1	5	.....				44
Bed-sore . . . . .	...	1	...	1	.....											1	28
Cicatrices—																		
a. Face and neck	1	...					1	.....						1	.....		68
b. Lower lip	1	...	1	.....								1	.....				52

	TOTAL.		AGES.										RESULT.					Average stay in Hospital in days.
	M.	F.	5	10	15	20	30	40	50	60	+	C.	R.	U.	S.	D.		
GENERAL INJURIES—																		
Burns	8	11	7	4	...	...	1	...	3	...	4	10	...	...	...	9	35
Scalds	11	7	7	3	1	3	...	2	2	...	...	17	...	...	...	1	27
Multiple injury . . .	5	1	...	...	...	...	...	...	2	1	3	4	...	...	...	2	47
LOCAL INJURIES—																		
<i>Head—</i>																		
<i>Scalp wound—</i>																		
a. Bone not exposed .	11	6	1	...	3	...	4	2	4	2	1	13	3	...	...	1	17
b. Bone exposed . . .	2	2	...	1	...	...	2	...	...	1	...	4	...	...	...	...	35
Concussion of brain .	17	4	2	...	1	2	10	3	2	1	...	21	...	...	...	...	30
<i>Fract. of vault of skull—</i>																		
a. Without depression .	4	...	...	1	...	...	1	1	...	1	...	2	1	...	1	...	72
b. With depression . .	...	2	1	1	...	...	...	...	...	...	...	1	...	...	...	1	31
Fract. of base of skull .	2	3	1	...	1	...	1	1	1	...	...	3	1	...	...	1	42
Contusion of brain . .	1	...	...	...	...	...	1	...	...	...	...	...	...	...	...	1	2
<i>Face—</i>																		
Contusion	5	3	1	1	1	...	2	...	1	2	...	7	1	...	...	...	17
Wound	9	...	2	...	1	...	3	1	...	...	2	7	2	...	...	...	14
<i>Fracture of lower jaw—</i>																		
a. Compound	3	2	...	...	1	1	1	...	...	1	1	...	3	...	2	...	30
b. Ununited	1	...	...	...	...	...	...	...	...	1	...	...	...	...	...	1	38
<i>Eye—</i>																		
Contusion of globe . .	1	...	...	...	...	...	...	...	1	...	...	...	1	...	...	...	59
Wound of cornea . . .	2	1	...	1	1	...	1	...	...	...	...	1	2	...	...	...	10
„ lens	1	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	30
Complicated wounds . .	5	...	1	...	1	...	1	1	...	1	...	1	...	1	3	...	46	
Chemical injury . . . .	...	1	...	...	...	...	...	1	...	...	...	1	...	...	...	...	13
<i>Neck—</i>																		
Contusion of soft parts	1	...	...	...	...	...	...	...	...	1	...	...	1	...	...	...	8
Wound (cut throat) . .	1	...	...	...	...	...	...	...	...	1	...	...	1	...	...	...	23
Foreign body in air- passages	1	...	...	1	...	...	...	...	...	...	...	1	...	...	...	...	17
Injury of pharynx and glottis by corrosives .	1	...	1	...	...	...	...	...	...	...	...	1	...	...	...	...	3
<i>Chest—</i>																		
Contusion	7	1	1	...	1	...	3	1	1	1	...	8	...	...	...	...	10
<i>Fracture of ribs—</i>																		
a. Simple	10	...	...	...	1	...	2	2	2	1	2	10	...	...	...	...	21
b. Complicated	1	...	...	...	...	...	1	...	...	...	...	...	1	...	...	...	60
Fracture of sternum . .	1	...	...	...	...	1	...	...	...	...	...	...	1	...	...	...	28
Wound	1	...	...	...	1	...	...	...	...	...	...	...	1	...	...	...	15
Gunshot wound	1	...	...	...	...	...	1	...	...	...	...	...	1	...	...	...	120
<i>Back—</i>																		
Contusion	8	4	...	...	2	4	2	2	1	1	...	11	...	...	1	...	10
Sprain	1	...	...	...	...	...	1	...	...	...	...	...	1	...	...	...	3
Fracture of spine . . .	2	...	...	...	...	1	...	...	...	1	...	...	1	...	...	1	8
Injury of cord without obvious fracture . . .	5	...	...	...	...	...	1	1	1	...	2	...	5	...	...	...	116
<i>Abdomen—</i>																		
Contusion	3	2	...	2	...	1	2	...	...	...	...	5	...	...	...	...	6
Visceral injury	3	...	1	1	...	...	1	...	...	...	...	...	1	...	...	2	5
<i>Pelvis—</i>																		
Contusion	1	1	...	1	...	...	...	1	...	...	...	2	...	...	...	...	17

	TOTAL.		AGES.										RESULT.					Average stay in Hospital in days.
	M.	F.	5	10	15	20	30	40	50	60	+		C.	R.	U.	S.	D.	
<i>Pelvis (continued)</i> —																		
Wound of scrotum	1	...	...	...	1	...	...	...	...	...	...	...	1	...	...	...	...	14
Laceration of urethra	1	...	...	...	1	...	...	...	...	...	...	...	1	...	...	...	...	213
Fracture—																		
<i>a.</i> Simple	1	...	...	...	...	1	...	...	...	...	...	...	1	...	...	...	...	45
<i>b.</i> Complicated	1	...	...	...	...	...	...	1	...	...	...	...	...	...	...	1	...	1
<i>Upper Extremities</i> —																		
Contusion . . . . .	...	1	...	...	...	...	...	...	...	...	...	1	1	...	...	...	...	64
Sprain (wrist)	1	...	...	...	...	...	1	...	...	...	...	1	...	...	...	...	...	47
Wound	8	2	...	1	...	3	3	...	1	...	...	2	7	3	...	...	...	3
" of wrist-joint . . . . .	...	1	...	...	...	1	...	...	...	...	...	1	...	...	...	...	...	64
Separation of epiphysis—																		
Humerus	2	...	1	...	1	...	...	...	...	...	...	2	...	...	...	...	...	21
Fracture—																		
Clavicle	2	...	1	1	...	...	...	...	...	...	...	1	1	...	...	...	...	14
Scapula	1	...	...	...	...	...	...	...	1	...	...	...	1	...	...	...	...	11
Humerus—																		
<i>a.</i> Simple	4	1	...	...	1	1	1	...	...	...	...	2	5	...	...	...	...	46
<i>b.</i> Compound and complicated	2	...	...	...	...	...	1	...	...	...	...	1	1	...	...	1	...	63
Forearm—																		
<i>a.</i> Simple	1	...	...	...	...	...	1	...	...	...	...	...	1	...	...	...	...	13
<i>b.</i> Compound	1	1	...	...	1	...	1	...	...	...	...	2	...	...	...	...	...	50
<i>c.</i> Compound and complicated	1	1	...	...	...	1	...	...	1	...	...	1	...	...	...	1	...	19
Carpus, &c.—																		
Compound	4	...	...	1	1	1	1	...	...	...	...	4	...	...	...	...	...	35
Multiple fracture	2	...	...	...	1	1	...	...	...	...	...	1	1	...	...	...	...	77
Dislocation—																		
Acromio-clavicular joint . . . . .	...	1	...	...	...	...	...	...	1	...	...	1	...	...	...	...	...	13
Shoulder-joint—																		
Axillary	2	...	...	...	...	...	...	1	1	...	...	2	...	...	...	...	...	12
Thumb . . . . .	...	1	...	...	...	...	1	...	...	...	...	...	...	1	...	...	...	2
<i>Lower Extremities</i> —																		
Contusion	13	5	1	4	4	3	3	2	...	...	...	1	16	1	...	...	1	12
Sprain, &c.	10	5	1	...	...	1	5	5	...	3	...	12	3	...	...	...	...	17
Wound	7	3	1	2	2	2	2	...	...	...	...	1	10	...	...	...	...	41
" of joint	3	...	...	...	...	...	3	...	...	...	...	3	...	...	...	...	...	69
Green-stick fracture	1	...	...	1	...	...	...	...	...	...	...	1	...	...	...	...	...	70
Fracture—																		
Femur—																		
<i>a.</i> Simple	19	11	13	3	2	2	1	2	3	1	3	28	...	...	1	1	...	49
<i>b.</i> Comminuted	1	...	...	...	...	...	...	...	...	...	...	1	1	...	...	...	...	57
<i>c.</i> Complicated	2	1	...	...	...	...	1	...	1	...	...	1	3	...	...	...	...	53
Patella	4	2	...	...	...	...	1	2	...	2	1	6	...	...	...	...	...	53
Leg (both bones)—																		
<i>a.</i> Simple	23	3	1	2	...	1	2	6	5	9	...	25	1	...	...	...	...	41
<i>b.</i> Compound	2	1	...	...	...	1	...	...	2	...	...	2	...	...	...	1	...	62
<i>c.</i> Compound and comminuted	1	...	...	...	...	...	...	...	...	1	...	1	...	...	...	...	...	70
Tibia alone—																		
<i>a.</i> Simple	9	...	...	4	2	2	...	1	...	...	...	9	...	...	...	...	...	29
<i>b.</i> Compound	1	...	...	...	...	...	1	...	...	...	...	1	...	...	...	...	...	36

	TOTAL.		AGES.									RESULT.					Average stay in Hospital in days.
	M.	F.	5	10	15	20	30	40	50	60	+	C.	R.	U.	S.	D.	
<i>Lower Extremities</i> (continued)—																	
Fracture—																	
Fibula alone . . .	13	2	...	...	1	...	4	2	5	2	1	13	2	...	...	...	21
Foot . . .	6	...	...	...	1	2	1	1	1	...	...	6	...	...	...	...	46
Multiple fracture .	1	...	...	...	...	...	1	...	...	...	...	...	...	...	...	1	1
Dislocations—																	
Hip-joint (dorsal).	1	...	...	...	...	...	...	1	...	...	...	1	...	...	...	...	17
Ankle-joint . . .	...	1	...	...	...	...	...	1	...	...	...	1	...	...	...	...	20
CASES NOT CLASSIFIED—																	
Slight pain aft. union of fracture . . .	1	...	...	...	...	...	1	...	...	...	...	...	...	1	...	...	7
Medical cases ad- mitted to surgical side in error . . .	...	3	...	1	...	...	1	1	...	...	...	...	...	3	...	...	12
Unexamined . . .	1	1	...	...	...	1	...	...	...	...	1	...	...	2	...	...	30
Total . . .	606	307										546	187	54	50	76	

SURGICAL OPERATIONS.	SEX.		AGES.								RESULT.					Average duration of resid. aft. oper.
	M.	F.	5	10	15	20	30	40	50	60	+	C.	R.	U.	S.		D.
ON THE EYE AND ITS APPENDAGES—																
For entropium . . .	1	...	...	...	...	...	...	...	...	1	...	...	1	...	...	13
For strabismus . . .	2	1	...	1	...	1	...	...	...	1	...	3	...	...	...	11
ON THE EYEBALL—																
Iridectomy . . .	...	1	...	1	...	...	...	...	...	...	...	...	1	...	...	65
Solution of lens . . .	...	2	...	2	...	...	...	...	...	...	...	...	1	1	...	45
Extraction of lens—																
Hard cataract . . .	2	4	...	...	...	...	...	1	1	4	3	1	2	...	...	53
Traumatic cataract . . .	2	...	...	...	...	...	...	1	...	1	...	1	...	1	...	52
Abscission of globe . . .	...	1	...	...	...	...	...	1	...	...	...	1	...	...	...	20
ON ARTERIES—																
Ligature . . .	...	1	...	...	...	...	1	...	...	...	...	1	...	...	...	45
Temporary constriction . . .	1	...	...	...	...	...	...	1	...	...	...	...	...	...	1	5
Acupressure . . .	1	...	...	...	...	...	1	...	...	...	...	...	1	...	...	30
ON VEINS—																
Obliteration of varicose veins . . .	4	...	...	...	...	1	...	1	1	1	...	3	1	...	...	18
Venesection . . .	1	...	...	...	...	1	...	...	...	...	...	...	...	...	1	6
FOR HÆMORRHAGE—																
Plugging of nostrils . . .	2	...	...	...	1	...	...	...	1	...	...	1	1	...	...	10
ON JOINTS—																
Reduct. of dislocations—																
a. Acromio-clavicular joint . . .	...	1	...	...	...	...	...	...	1	...	...	1	...	...	...	12
b. Shoulder . . .	2	...	...	...	...	...	...	...	1	1	...	2	...	...	...	12
c. Hip . . .	1	...	...	...	...	...	1	...	...	...	...	1	...	...	...	16
d. Ankle . . .	...	1	...	...	...	...	...	...	1	...	...	1	...	...	...	19
Extension of stiff and deformed joints—																
Elbow . . .	1	1	...	...	1	...	...	1	...	...	...	...	2	...	...	58
Excision of joints—																
a. Elbow . . .	1	1	...	...	...	...	...	1	1	...	...	...	1	...	1	49
b. Wrist . . .	1	...	...	...	...	...	...	...	1	...	...	...	1	...	...	262
c. Hip . . .	1	...	...	...	1	...	...	...	...	...	...	...	1	...	...	350
d. Knee . . .	6	2	...	2	2	1	3	...	...	...	...	4	3	1	...	160
e. Great toe-joint . . .	...	1	...	...	...	...	...	...	1	...	...	...	...	1	...	74
ON BONES—																
Removal of dead bone—																
a. Cranium . . .	1	...	...	1	...	...	...	...	...	...	...	...	1	...	...	14
b. Lower jaw . . .	...	1	...	...	1	...	...	...	...	...	...	...	1	...	...	8
c. Clavicle . . .	1	...	...	...	1	...	...	...	...	...	...	...	1	...	...	36
d. Humerus . . .	...	1	...	1	...	...	...	...	...	...	...	...	1	...	...	53
e. Radius . . .	...	1	...	1	...	...	...	...	...	...	...	...	1	...	...	12
f. Pelvis . . .	1	1	1	...	1	...	...	...	...	...	...	...	2	...	...	80
g. Femur . . .	4	...	...	1	2	...	...	...	1	...	...	2	2	...	...	79

SURGICAL OPERATIONS.	SEX.		AGES.										RESULT.					Average duration of resid. aft. oper.
	M.	F.	5	10	15	20	30	40	50	60	+	C.	R.	U.	S.	D.		
REMOVAL OF TUMOURS (continued)—																		
For fatty tumours . . .	3	...					1			1	1	3					10	
For glandular tumour of breast . . .	...	1				1						1					60
For cyst. tum. (ovarian) . . .	...	1				1										1	3
Remov. of hæmorrhoids—																		
External . . .	1	...					1						1				36	
Internal . . .	2	...								1	1	2					14	
REMOVAL OF CALCULI—																		
Vesical—																		
<i>a.</i> By lithotomy . . .	2	...	1				1					2					43	
<i>b.</i> By lithotripsy . . .	1	...									1		1				90	
<i>c.</i> From urethra . . .	1	...	1									1					20	
INCISIONS—																		
Tracheotomy—																		
Foreign body . . .	1	...		1								1					16	
Croup . . .	1	...	1													1	1	
Colotomy . . .	2	1	1							2						3	45	
For strang. hernia—																		
Sac opened—																		
Femoral . . .	1	4								1	2	2	3			2	23	
Inguinal . . .	3	1					1	2				1	1			3	17	
Sac not opened—																		
Femoral . . .	...	4								1	2	1	3			1	42
For fistula in ano . . .	2	1				1	2					3					22	
For stricture of rectum . . .	1	...									1		1				44	
For spasm of sphincter . . .	...	1								1			1				8
Perineal section . . .	9	...			1		4	1	2	1		3	3			3	63	
Internal urethrotomy—																		
Sudden dilat. (Holt) . . .	2	...					2					2					16	
Tenotomy—																		
For talipes . . .	1	2	2							1		2		1			84	
For torticollis . . .	1	...			1								1				37	
REPARAT. OPERATIONS—																		
For ulcer, &c.—																		
Skin grafting . . .	4	3	...	1				1	5			5	...	2			132	
For cicatrices—																		
Of lip . . .	1	...	1									1					40	
Of face and neck . . .	1	...					1							1			34	
For vesico-vagin. fistula . . .	...	1					1					1					20
For deformities—																		
Harelip . . .	1	1	1	1								2					45	
Cleft palate . . .	1	3	1	2	1							1	2	1			30	
Phymosis . . .	3	...	1		1		1					3					16	
Epispadias . . .	1	...	1											1			29	
OPERATIONS NOT CLASSIFIED—																		
Paracentesis of hydrocele . . .	3	...					1	2				1	...	2			18	

SURGICAL OPERATIONS.—REMARKS.

EYE.

Entropium.—Caused by lime injury. V-shaped piece of skin excised, lower lid.

Strabismus.—Both eyes operated upon in 2 cases.

EYEBALL.

Iridectomy.—For persistent cyclitis. No relief.

Solution of lens.—Operation repeated three times in 1 case. Eye destroyed by irido-cyclitis.

Extraction of lens (hard cataract).—One case double; both eyes cured; op. linear with iridectomy. Four cases linear with iridectomy; lens extracted by scoop. 2 C., 2 V.

(*Traumatic*).—Linear, with iridectomy; lens extracted with scoop.

Abcession of Globe.—For staphyloma, with much pain. Critchett's operation.

ARTERIES.

Ligature.—Aneurism of brachial artery. Forced flexion and tourniquet failed.

Temp. constriction.—Popliteal aneurism. Death from pleurisy and bronchitis while under treatment.

Acupressure.—For aneurism by anastomosis of ext. car. Operation partly successful. Cure by galvanic cautery.

VEINS.

Obliteration of varix.—All by needles and silk.

Venesection.—For cerebro-spinal meningitis. No relief.

FOR HÆMORRHAGE.

Plugging of nostrils.—Post. nares, for severe epistaxis.

JOINTS.

REDUCTION OF DISLOCATIONS.

Acromio-clavic. joint: Shoulder.—Both axillary; one reduced by manipulation, the other by knee in axilla. No chloroform.

Hip.—Dorsal; reduced by manipulation without chloroform. (Patient drunk.)

Ankle.—Foot dislocated backwards; complicated with fracture of fibula.

EXTENSION OF STIFF JOINTS.

Elbow.—A certain amount of mobility obtained, but no freedom of action.

EXCISION OF JOINTS.

Elbow.—One for compound fracture into ankylosed joint. Death from rapid exhaustion. Long-standing disease in the other case. Relieved.

Wrist.—Operation on Lister's plan; case very successful. (See 'St. Thos. Hosp. Rep.,' 1871.)

Hip.—Head and part of neck of bone removed; subsequently large portions of pubes and ischium.

Knee.—In 3 cases sequestrum was found in head of tibia; joint structures secondarily diseased. Of these 1 was cured, 1 relieved, and 1 unrelieved, the limb in the latter case subsequently requiring amputation.

In 2 cases sequestrum was found in condyles of femur. 1 cured, 1 relieved.

In 1 case abscess found in head of tibia. Cured.

In 1 case subarticular caries appeared to be the original disease. Cured.

In 1 case the disease was confined to cartilage and synovial membrane, the former inflamed, and in places lost, the latter pulpy and thickened. Relieved.

One patient was phthisical (2nd stage). Operation successful, and chest symptoms relieved.

Great toe-joint.—Operation failed. Subsequent Syme's amputation.

BONES.

REMOVAL OF DEAD BONE.

Cranium.—Necrosis, traumatic.

Lower jaw.—Necrosis, traumatic; fracture.

Clavicle.—Whole shaft necrosed, except acromial end; sternal epiphysis intact.

Humerus.—Whole shaft necrosed; epiphysis not involved; result of acute osteitis.

Radius.—The new bone was scanty at the time of operation, and fracture resulted; case did well eventually.

Pelvis.—Ilium in both cases.

Femur.—Popliteal surface of bone affected in 2 cases; in 1 of these several sequestra were removed.

Tibia.—Necrosis traumatic in 2 cases.

Fibula.—Shaft.

Foot.—Caries.

OPERATION FOR UNUNITED FRACTURE.

Lower jaw.—Fractured ends sawn off; death from phthisis.

OPERATION FOR FAULTY ANKYLOSIS.

Section of neck of femur.—Thigh fixed in a flexed position, result of old hip disease; operation subcutaneous, preceded by tenotomy of rectus and sartorius; death from pyæmia.

AMPUTATIONS.

	Sex.	Age.	Injury or disease.	Place of amputation.	Method.	Vessel secured by	Result and remarks.
Arm—primary . . .	M.	25	Compound fract. into elbow-joint	Middle $\frac{1}{3}$ rd	Flap	Torsion	Cured.
secondary . . .	M.	63	" "	Lower $\frac{1}{3}$ rd	Circular	"	Death from pyæmia.
Forearm—primary . .	M.	29	Crushed hand	" "	Flap	Ligature	Cured.
Hand—primary . . .	M.	15	Crushed by machine	Wrist-joint	"	"	Cured.
Hip—for disease . . .	F.	11	Disease of femur and pelvis	Joint	"	"	Death 3 hours after operat. ; shock.
Thigh—primary . . .	M.	30	Legs crushed by railway car	Upper $\frac{1}{3}$ rd	"	"	Death from shock.
" for disease . .	M.	14	Disease of femur and tibia after excision of knee-joint	Lower $\frac{1}{3}$ rd	"	"	Cured; amputation, &c., on Lister's plan.
" . . .	M.	29	" "	" "	"	"	Death 8 hours after operat. ; visc. and other disease.
" . . .	M.	9	" "	" "	"	Torsion	Cured.
" . . .	F.	27	Disease of knee-joint	" "	"	"	Death from shock ; pyæmia before operation.
" . . .	M.	30	" "	" "	"	Ligature	Cured.
" . . .	M.	29	" "	" "	"	"	Cured ; phthisis, third stage.
" . . .	F.	18	" "	" "	"	"	Cured ; strumous subject.
" . . .	M.	53	" "	" "	"	Torsion	Death from shock.
" . . .	M.	52	" "	" "	"	Ligature	Cured.
Leg—secondary . . .	M.		Compound comminuted fracture ; suppuration ; secondary hæmorrhage	Upper $\frac{1}{3}$ rd	"	"	
" for disease . .	M.	22	Sarcoma of tibia	Middle $\frac{1}{3}$ rd	"	Torsion	Cured.
" . . .	M.	41	Disease of ankle and tarsus	" "	"	"	Death from pyæmia 2 days after operation ; symptoms preceded amputation.
Foot—primary . . .	M.	17	Crushed foot	Joint (Syme's)	"	Ligature	Death from exhaustion.
secondary . . .	M.	64	Traumatic gangrene	" "	"	Torsion	Death from tetanus 7 days after operation.
" for disease . .	F.	52	Disease of ankle and tarsus	" "	"	"	Cured.
" . . .	F.	36	Disease of tarsus	" "	"	"	Cured.

REMOVAL OF TUMOURS.

Scirrhus.—Breast; fatal case died of pyæmia.

Sarcoma.—Neck; second appearance.

(a) *Spindle-celled sarcoma*.—Breast; tumour recurred twice; patient left hospital in a dying state.

(b) *Fasciculated sarcoma*.—Leg amputated; tumour recurred in six months.

(c) *Round-celled sarcoma*.—One, melanotic, on skin of abdomen; the other in ball of thumb.

Fatty tumours.—Two over scapula, 1 in nape of neck.

Cystic tumour.—Ovariectomy. Tumour multilocular, adherent; clamp; actual cautery; death from peritonitis eighty-four hours after.

REMOVAL OF HEMORRHOIDS.

Internal.—In 1 case clamp and actual cautery used, in the other ligature applied.

REMOVAL OF CALCULI.

By lithotomy.—Lateral operation. One stone composed of oxalate of lime, weight 2 drachms; the other uric acid and urate of ammonia, size of Spanish nut.

By lithotripsy.—Eleven operations. Stone about 1½ inch in diameter, uric acid and oxalate of lime.

From urethra.—Small uric acid stone.

INCISIONS.

Tracheotomy.—Below thyroid isthmus; foreign body (piece of apple) not found, but relief was immediate. In the other case the operation gave no relief.

Colotomy.—All in left loin. One for cancer of rectum; relieved for four months. One for vesico-intestinal fistula; died from peritonitis. And one for abscess of anus; died.

Herniotomy.—See Special List.

For fistula-in-ano.—Phthisis in 1 case.

For stricture of rectum.—Stricture cancerous; sphincter and thickened wall freely incised.

For spasm of sphincter.—Sphincter divided.

Perineal section.—One for laceration of urethra, 1 for stricture and chronic cystitis, 1 for traumatic stricture, 4 for stricture and perineal fistula, 1 for stricture and perineal abscess. Of the fatal cases, 1 died of exhaustion (operated upon for extravasation of urine); 1 of cystitis and pneumonia; 1 of suppurative nephritis. In 1 case permanent fistula remained after operation.

Tenotomy.—For talipes. Tendo Achillis divided in 1 case (T. equinus); tendons of tibiales anticus and posticus in 1 case (double T. varus); tendons of tibiales anticus and posticus and tendo Achillis in 1 case (double T. equinovarus).

REPARATIVE OPERATIONS.

Skin grafting.—In the unsuccessful cases the grafts were detached by discharge.

FOR CICATRICES.

Of lip.—Lower lip everted after burn.

Of face and neck.—From burn. Cicatricial tissue dissected off and skin grafts placed upon raw surfaces; failed.

FOR DEFORMITIES.

Harelip.—Both single.

Cleft palate.—In 2 cases two thirds of hard palate involved; in 1 case the operation failed; in 2 the lower part of the fissure only closed; the fourth case very successful.

Epispadias.—Edges of open urethra pared and brought together.

STRANGULATED HERNIA.
SPECIAL TABLE.—*Herniotomy and Taxis.*

Occupation.	Sex	Age.	Nature of hernia.	Duration.	Period of strangulation.	Contents of sac.	Seat of stricture.	Result.	Remarks.
Widow . .	F.	69	Femoral, left	30 yrs.	18 hrs.	Omentum, knuckle of intestine	Gimbernat's ligament.	Death	Peritonitis; death 3 days after operation.
Married . .	F.	54	" right	10 "	50 "	Do.	Do.	Do.	Peritonitis; death 11 days after operation; omentum removed by cautery.
Gardener . .	M.	62	" left	5 mos.	4 dys.	Do.	Do.	Cured	Seq., orchitis and suppuration in scrotum.
Married . .	F.	42	" right	2 yrs.	4 "	Congested intestine	Do.	Do.	—
Widow . .	F.	55	" "	10 "	21 hrs.	Intestine, and probably Fallop. tube	Do.	Do.	—
Painter . .	M.	26	Inguinal, right	Congen.	5 "	Congested intestine	Intest. ring	Do.	Seq., orchitis and sup. around wound.
—	M.	63	" "	30 yrs.	3 dys.	Intestine, nearly black	Do.	Death	Limited peritonitis; clots in mes. veins; death 2 days after operation.
—	M.	33	" "	4 "	4 "	Intestine	Do.	Do.	Peritonitis; death 3 days after operation.
Married . .	F.	36	" "	3 "	1 wk.	Do.	Do.	Do.	Erysipelas and profuse suppurat.; death 6 days after operation.
Widow . .	F.	78	Femoral, left	40 "	43 hrs.	<i>Sac not opened</i>	Gimbernat's ligament	Cured	—
Married . .	F.	56	" right	28 "	9 "	Do.	Do.	Do.	Seq., suppuration around wound.
Do.	F.	56	" "	19 "	15 "	Do.	Do.	Death	Capil. bronch.; hernia comp. with hæm. from bowels; death 11 d. after op.
Do.	F.	46	" "	18 "	27 "	Do.	Do.	Cured	Hernia irred. for 12 mos. before admis.
—	M.	44	Inguinal, right	10 "	5 "	<i>Taxis</i>	—	Do.	Reduced after patient had been chloroformed for operation.
Brush maker.	M.	67	" "	40 "	3 dys.	Do.	—	Relieved	Hernia only partially reduced; symp. rel.
Cabman . .	M.	39	" "	? "	48 hrs.	Do.	—	Cured	Taxis successful after warm bath and application of ice-bag.
—	M.	42	" "	3 yrs.	24 "	Do.	—	Do.	
Washerwoman	F.	52	Femoral, left	16 "	3 "	Do.	—	Do.	
Married . .	F.	48	" right	? "	4 "	Do.	—	Do.	

SPECIAL TABLE—*Erysipelas.*

No.	Occupation.	Sex.	Age.	Nature of previous disease or injury.	Occurrence after injury. Days.	Parts attacked.	Treatment.	Result and remarks.
1	Ticket writer	M.	29	Bubo; incised	4	Thigh and leg	Tonics; punctures; incisions	Followed by diffuse abscesses in leg.
2	Sawyer	M.	62	Scirrhus of rectum	—	Face	Purge; iron	Cured in 4 days.
3	Schoolboy.	M.	12	Necrosis of tibia	—	Leg	Purge; iron; collodion	Cured in 17 days; developed before admission.
4	Child	M.	6	Abscess over ankle; incised	18	Do.	Purge; iron	Cured in 5 days.
5	Farm labourer	M.	45	Disease of wrist-joint; excised	37	Hand and arms	Purge; emetics	Repeated attacks, each lasting 5—7 days.
6	Butcher	M.	41	Disease of ankle; incisions	10	Leg	Salines; morphia	Severe hiccup and vomiting, 13 days; death from pyæmia 9 days after cure.
7	Labourer	M.	22	Chronic ulcer of leg.	—	Do.	Purge; iron	Cured in 7 days.
8	Carpenter	M.	28	Scalp wound	11	Face and head	Purge; collodion	" 7 "
9	Butcher	M.	22	Contused wound over temple	6	Do.	Bark and acid	" 10 "
10	Carman	M.	27	Sup. adenoid tun. in axilla	—	Axilla & chest	Salines	Died on 7th day; no post-mortem.
11	—	M.	62	Scalp wound	14	Head and face	Purge	Cured in 8 days.
12	—	M.	26	Wound on cheek	3	Face	Purge; salines	" 12 "
13	Married	F.	28	Seton in temple	11	Do.	Iron	" 8 "
14	Infant.	F.	8 m.	Abscess above knee; incised	14	Leg	Purge; collodion	" 5 "
15	Nurse	F.	55	Carbuncle on nape of neck	—	Face	Iron	" 7 " did not start from wound.
16	Married	F.	51	Scalp wound	3	Do.	Do.	Death from pericard. and pleur. on 4th day; erysip. did not start from wound.
17	Servant	F.	16	Do.	10	Do.	Bark & ammonia	Cured in 6 days; erysip. com. in eyelids.
18	Laundress	F.	30	Do.	18	Head and face	Iron	Intemperate; cured in 17 days.
19	Married	F.	51	Amput. of cancerous breast	12	Chest	Salines	" 20 "
20	Laundress	F.	52	Ulcer of leg	—	Leg	Iron	Died on 3rd day; erysip. attended with profuse suppuration.
21	Married	F.	36	Operation for strangulated hernia	3	Thigh	Salines	Cured in 8 days.
22	Needlewoman	F.	29	Compound fracture of ulna	1	Arm	Bark & ammonia	" 2 " fatal pyæmia set in 7 days afterwards.
23	Servant	F.	55	Amput. of cancerous breast	7	Chest	Salines	

REMARKS ON ERYSIPELAS TABLE.

Of these 23 cases, 20 recovered, 3 died. Of the deaths, one (10) was undoubtedly due to the effects of the erysipelas, as the patient was previously in fair general health, and the disease for which he was admitted was progressing favorably; in another case (21) the patient had recently undergone herniotomy, but no symptoms of peritonitis were seen, and death was presumably due to asthenia from the erysipelas and the diffuse suppuration accompanying it; in the third instance (18) death resulted from pericarditis and pleurisy during the progress of the erysipelas. In two cases (6 and 23) the disappearance of the erysipelas was followed in a few days by fatal pyæmia. The disease was developed in the hospital wards in all but one of the cases; in 19 it started from open wounds, in the remaining 4 it appeared upon the face, at a greater or less distance from the external lesion.

Special predisposition was seen in only one case (5), a healthy farm labourer, the subject of excision of the wrist; he underwent 5 different attacks, at intervals of about 2 months, during his stay in the hospital. All readily subdued by emetics and purgatives.

In treatment, iron in large doses was tried in 9 cases, but the course of the disease did not appear to be in any marked degree influenced by the drug.

The previous health and habits of the patients presented nothing special for note; the majority were in fair general condition, none suffered from diabetes or renal disease, and only one was convicted of intemperance.

SPECIAL TABLE.—*Pyæmia.*

No.	Occupation.	Sex.	Age.	Nature of previous disease or injury. History.	Symptoms, &c.	Remarks.
1	Apprentice	M.	21	Fistula in ano of 3 months' duration; operation Dec. 3rd, 1870, followed by profuse suppuration. Previous health good; no phthisis.	Dec. 13, 1870.—Abscess behind olecranon, dullness and moist crepitation below right clavicle, copious discharge from wound, rigors, communicating emaciation. 14.—Abscess opened, rigors continued. 24.—Delirium, œdema of feet. Death on Jan. 1 (19th day). Highest temp. 105·3° (evening of 16th). March 7.—Febrile symptoms, and very unhealthy condition of both operation wounds. 10.—Diffuse suppuration in left thigh; incision. 20.—Profuse and foul discharge, emaciation; no distinct rigors. 27.—Pyæmic odour and aspect, perspiration, prostration; no evidence of suppuration elsewhere. 30.—Death. Temp. ranged between 100° and 103°. April 11.—Severe rigors, preceded for two days by chilliness and sleeplessness; profuse and foul discharge from wound. 13.—Rigors, sallow skin, emaciation, perspiration, slight confusion of intellect. Evening, temp. 103·5°. 15.—Amputation of leg, followed by rigors and profuse perspiration. 17.—Death. Feb. 22.—Effusion into left knee-joint, stump healthy, no rigors. 24.—Cadaverous aspect, prostration; temp. morning, 99·2° night, 100·8°; joint tapped by aspirator, 14 oz. of pus withdrawn. March 1.—Prolonged rigors, diarrhœa, vomiting; temp. evening, 98·6°. 3.—Prostration, death.	Treated with quinine, stimulants, and generous diet. No post-mortem examination.
2	Child	M.	8	Fibrous ankylosis of left hip, with deformity. Feb. 25.—Subcutaneous division of rectus and sartorius. March 3.—Subcutaneous section of neck of femur. Previous health pretty good.	March 7.—Febrile symptoms, and very unhealthy condition of both operation wounds. 10.—Diffuse suppuration in left thigh; incision. 20.—Profuse and foul discharge, emaciation; no distinct rigors. 27.—Pyæmic odour and aspect, perspiration, prostration; no evidence of suppuration elsewhere. 30.—Death. Temp. ranged between 100° and 103°. April 11.—Severe rigors, preceded for two days by chilliness and sleeplessness; profuse and foul discharge from wound. 13.—Rigors, sallow skin, emaciation, perspiration, slight confusion of intellect. Evening, temp. 103·5°. 15.—Amputation of leg, followed by rigors and profuse perspiration. 17.—Death. Feb. 22.—Effusion into left knee-joint, stump healthy, no rigors. 24.—Cadaverous aspect, prostration; temp. morning, 99·2° night, 100·8°; joint tapped by aspirator, 14 oz. of pus withdrawn. March 1.—Prolonged rigors, diarrhœa, vomiting; temp. evening, 98·6°. 3.—Prostration, death.	Treated with bark and ammonia, wine, &c. No p.-m. examination. The symptoms in this case could not be considered diagnostic; but, in the absence of positive contra-evidence by necropsy, it has been thought advisable to insert the history here.
3	Butcher	M.	41	Disease of right ankle-joint of 10 months' duration; health good. Incisions March 1 and 24; erysipelas. March 26.—Complicated by troublesome hiccup and vomiting. Cured April 7.	March 7.—Febrile symptoms, and very unhealthy condition of both operation wounds. 10.—Diffuse suppuration in left thigh; incision. 20.—Profuse and foul discharge, emaciation; no distinct rigors. 27.—Pyæmic odour and aspect, perspiration, prostration; no evidence of suppuration elsewhere. 30.—Death. Temp. ranged between 100° and 103°. April 11.—Severe rigors, preceded for two days by chilliness and sleeplessness; profuse and foul discharge from wound. 13.—Rigors, sallow skin, emaciation, perspiration, slight confusion of intellect. Evening, temp. 103·5°. 15.—Amputation of leg, followed by rigors and profuse perspiration. 17.—Death. Feb. 22.—Effusion into left knee-joint, stump healthy, no rigors. 24.—Cadaverous aspect, prostration; temp. morning, 99·2° night, 100·8°; joint tapped by aspirator, 14 oz. of pus withdrawn. March 1.—Prolonged rigors, diarrhœa, vomiting; temp. evening, 98·6°. 3.—Prostration, death.	Treated by quinine and stimulants. Amputation of leg, 15th April. No p.-m. examination. Pyæmic symptoms fairly characteristic, but no evidence of local deposits of pus could be detected.
4	Post-mistress	F.	27	Disease of right knee, of 5 years' duration; health feeble. Feb. 1.—Incision. 13.—Bedsores on sacrum. 18.—Amputation of thigh.	March 7.—Febrile symptoms, and very unhealthy condition of both operation wounds. 10.—Diffuse suppuration in left thigh; incision. 20.—Profuse and foul discharge, emaciation; no distinct rigors. 27.—Pyæmic odour and aspect, perspiration, prostration; no evidence of suppuration elsewhere. 30.—Death. Temp. ranged between 100° and 103°. April 11.—Severe rigors, preceded for two days by chilliness and sleeplessness; profuse and foul discharge from wound. 13.—Rigors, sallow skin, emaciation, perspiration, slight confusion of intellect. Evening, temp. 103·5°. 15.—Amputation of leg, followed by rigors and profuse perspiration. 17.—Death. Feb. 22.—Effusion into left knee-joint, stump healthy, no rigors. 24.—Cadaverous aspect, prostration; temp. morning, 99·2° night, 100·8°; joint tapped by aspirator, 14 oz. of pus withdrawn. March 1.—Prolonged rigors, diarrhœa, vomiting; temp. evening, 98·6°. 3.—Prostration, death.	Treated with large doses of quinine. Post-mortem appearances:—Miliary deposits in both lungs; small abscess in kidneys; pus in knee-joint and cellular tissue of thigh; no obstruction of femoral vein; stump not very unhealthy in appearance.

SPECIAL TABLE.—*Pyæmia (continued).*

No.	Occupation.	Sex.	Age.	Nature of previous disease or injury. History.	Symptoms, &c.	Remarks.
5	Servant	F.	55	Scirrhous of right mamma, 4 months' duration; health pretty good. July 19.—Amputation. 24.—Wound almost entirely healed. 26.—Erysipelas. 29.—Erysipelas cured.	Aug. 4.—Fever and delirium at night, no rigors noticed; operation wound healed, except at a pinhole near centre of scar. 5.—Typhoid aspect, mental torpor. 7.—Abscesses in left elbow-joint and calf of right leg; temp. evening, 103·5°. 9.—Diarrhœa, profuse perspiration; temp. morning, 105·3; death in afternoon.	Treated with salines, stimulants, &c. No p.m. examination. In this case rigors were entirely absent, and the diarrhœa and perspirations did not appear until the day before death. Would never unhealthily.
6	Engineer	M.	63	Compound fracture of humerus into elbow-joint (right). Feb. 11.—Suppuration. March 29.—Suppur. profuse; strength failing; amputation of arm.	April 3.—Rigors, profuse discharge, pallor, prostration, cough. 4.—Rigors; temp. morning, 105·3°. 5.—Rigors, sweating; temp. morning, 98·6°. 8.—Pain on left side, severe rigors; temp. morning, 103·4°. 11.—Rigors, prostration, death.	Treated with stimulants, &c. Post-mortem appearances:—Pus in left pleura; abscesses in both lungs; purulent bronchitis; abscess in rt. shoulder-joint; osteo-myelitis of humerus above section; no obstruction of veins.
7	Gardener	M.	19	Compound fracture of tibia and fibula. March 14.—Very unhealthy condition of wound.	May 20.—Prostration, vomiting, albuminuria, jaundice, with great enlargement of liver; manner altered; no rigors, except once to a slight extent a week ago. 21.—Intense jaundice; no delirium or rigors; death in evening.	Treated with salines. Post-mortem appearances:—Abscesses in both lungs; pleurisy; bronchial congestion; 4 large abscesses in right lobe of liver; intense inflammation of kidneys; no obstruction of femoral vein.

SPECIAL TABLE.—*Tetanus.*

No.	Occupation.	Sex.	Age.	Probable cause.	Occur. aft. inf. Days.	Symptoms, &c.	Treatment.	Remarks.
1	Carman	M.	27	Lacerated wound of thumb (June 12).	5	June 16.—Trismus and well-marked tonic and clonic spasm of muscles of trunk; patient appeared to suffer little pain; sound sleep after chloral draught. 17.—Tonic spasm of neck and jaws, with apparent unconsciousness. Consciousness restored just before death, which occurred from spasm of muscles of respiration 36 hours after first appearance of symptoms.	Chloral hydrate on 16th; section of nerve.	No post-mortem examination. The patient was a healthy, muscular man.
2	Fishmonger	M.	36	Compound dislocation of little finger (May 1); wound unhealthy and painful.	5	May 7.—Tonic spasm of muscles of mastication and of neck. 8.—Slight emprosthotonos in morning; severe opisthotonos in afternoon, followed by exhaustion, but attended with little pain. Fatal spasm of respiratory muscles in evening, 24 hours after first appearance of symptoms. Temp. never over 99.5°.	Amputation of finger, May 8th; chlor. hydrate.	Post-mortem showed no abnormality, except some congestion of lungs posteriorly; spinal cord and ulnar nerve set aside for future examination; apparently intact. The patient appeared to have been a very healthy man.

SPECIAL TABLE.—*Tetanus (continued).*

No.	Occupation.	Sex.	Age.	Probable cause.	Occur. aft. inj. Days.	Symptoms, &c.	Treatment.	Remarks.
3	Printer	M.	15	Doubtful; carious and painful tooth (up. mol.); no history of any injury.	?	June 8.—Admitted with trismus of 10 days' duration; occasional opisthotonos and diaphragmatic spasm, constipation, breath foul. 9th.—Repeated paroxysms; sleep after chloral draughts. Gradual improvement after 10th. Cure. Temp. always under 100°.	Chloral hydrate in frequently repeated doses, 12th.—Vin. Ferri prescrib.; tooth extracted.	—
4	Married	F.	52	Explor. operation on discs, ankle, June 7.—Syme's amputat. July 5.—Stump unhealthy.	8	July 13.—Trismus; severe clonic spasms of muscles of back and of respiratory muscles. 16.—Coma and stertor. 17.—Severe spasm in morning. Death in evening, 5 days after commencement of symptoms. Temp. never over 100°.	Chloral hydrate; purgatives.	No post-mortem examination. Health feeble.
5	Child	F.	9	Scald, Nov. 18, 1870.	17	Dec. 5.—Slight tonic and clonic spasms. 6.—Distinct risus and opisthotonos; kept in control by the chloral. 20.—Great improvement, slept soundly, spasm completely relaxed. Slight risus observable under emotion until about Dec. 25. Discharged cured March 15, 1871.	Chloral hydrate; purgatives.	—

SPECIAL TABLE—*Hæmorrhage, Reactionary and Secondary.*

No.	Occupation.	Sex.	Age.	Injury or operation.	Occurrence after injury.	Nature and source.	Treatment and remarks.
1	Labourer . .	M.	22	Circumcision	2½ hours	Reactionary; small artery near frænum	Cold and exposure.
2	Dealer . . .	M.	35	Excision of elbow	12 "	Reactionary; numerous small vessels	Do.
3	Carter . . .	M.	64	Syme's amputation for crushed foot	12 "	Reactionary; branch of post. tibial artery	Cold and pressure; previous debility much increased by loss of blood; death 8 hours after operation.
4	Child . . .	M.	2½	Lithotomy; lateral	11 "	Reactionary; small branch of int. pudic artery	Torsion of bleeding vessel.
5	Hawker . . .	M.	31	Lacerated wound of temple	28 days	Secondary; branch of ant. temporal artery	Compress; wound nearly healed at time of occurrence of bleeding.
6	Painter . . .	M.	52	Compound comminuted fracture of leg; subsequent supuration and exfoliation	3 months	Secondary; ant. tibial artery	Compress; amputation on following day; subsequent recovery.
7	Boy	M.	13	Fracture of radius; severe crushing of soft parts (run over by tramway car)	21 days	Secondary	Compression of brachial; amputation of arm above elbow; recovery.
8	Widow . . .	F.	55	Amputation of breast for large sarcomatous tumour	9 days	Secondary; branch of int. mammary artery	Cold and pressure.

Medical Diseases developed during Surgical Treatment.

No.	Disease.	Sex.	Age.	Admitted for	Occurrence after admission	Treatment.	Remarks.
1	Varicella	M.	20	Anaurosis	20 days	Transferred to physicians' wards.	Cured and readmitted into surgical wards.
2	Do.	M.	22	Cerebral injury	22 "	Do.	Do.
3	Do.	M.	6	Fracture of femur	30 "	Do.	Died.
4	Do.	M.	12	Fracture of fibula	7 "	Do.	Cured.
5	Do.	M.	39	Do.	20 "	Do.	Do.
6	Do.	F.	18	Injury to back	1 day	Do.	Do.
6a	Rubeola	M.	19	Fracture of femur	16 days	Salines	Do.
7	Tubercular meningitis	F.	6	Disease of hip	4 months	Salines; cold to head	Died on 9th day of disease
8	Meningitis.	M.	40	Disease of ilium	6 weeks	Purge; cold to head	Died on 3rd day of disease
9	Mania (suicidal)	M.	20	Fracture of lower jaw	1 day	Sent to military infirmary	
10	Monomania (religious)	M.	19	Varicose veins	10 days	Do.	
11	Tonsillitis	F.	26	Synovitis	13 "	Salines; gargles	Cured.
12	Broncho-pneumonia	M.	32	Spinal injury	3 months	Bark and ammonia	Do.
13	Pleurisy and pericarditis	F.	51	Scalp wound	6 days	Ether and ammonia	Associated with attack of erysipelas; death.
14	Endopneumonitis (rheumatic)	F.	20	Disease of knee	6 months	Alkalies and tonics	Relieved.
15	Pleurisy and bronchitis	M.	33	Popliteal aneurism	3 days	—	Died on 4th day.

SUMMARY OF DISEASES AND INJURIES IN CLASSES,

WITH

REMARKS ON POINTS OF SPECIAL INTEREST AND
LEADING PARTICULARS OF AUTOPSIES.

GENERAL DISEASES.

Variola, Erysipelas, Pyæmia, &c. (See Special Tables.)

Chronic gout.—1, C. Softened tophaceous deposits within and around phalangeal joints of hands and feet. Treated successfully by incision and injection of dilute acetic acid.

Syphilis.—18. C. 9, R. 8, D. 1. In the fatal case the patient was admitted in a semi-comatose condition, and died three days afterwards. Gummatous deposits were found on the internal surface of left middle lobe and on the right anterior lobe of the cerebrum. Of the other cases, 1 was under treatment for iritis, 1 for sarcoma of testicle, 1 for serpiginous sores on back, abdomen, and nape of neck, and 1 for destructive ulceration of nose and palate; the remaining 13 suffered from cutaneous eruptions and the more ordinary manifestations of secondary syphilis.

Cancer.—a. *Scirrhus of breast.*—5, F. C. 2, R. 1, S. 1, D. 1. In all of these cases, except 1, the family history was negative. The ages of the patients ranged from 51 to 76. No marked cachexia present in any instance. Amputation was performed in 3 cases; in a fourth (recurrent cancer) caustic potash was applied, but without good result; in the fifth, operative interference was declined by the patient. In the fatal case death resulted from pyæmia after operation. The duration of the disease in one instance was six years, and there was no perceptible glandular enlargement, although the character of the tumour was unmistakable. In another case the disease made its appearance twelve years previously, and was removed at the end of seven years. The patient was readmitted with scirrhus induration in the cicatrix and extensive glandular enlargement, but without cachexia. Discharged unrelieved. The sister of the woman is said to have died of carcinoma uteri.

Scirrhus of parotid.—1, M. Patient was 45 years of age; no cachexia. No operation performed.

Scirrhus of sigmoid flexure.—1, M., æt. 61. No operative interference.

Scirrhus of rectum.—2, M. Ages 41 and 61. Colotomy performed in 1 case, affording great relief; death four months afterwards from asthenia.

Scirrhus of skin of hand.—1, F., æt. 35. Distinct scirrhus nodules, with glandular enlargement near elbow. Patient discharged, at her own request, without operation.

b. Medullary.—*Of superior maxilla*.—1, M., æt. 50. No operation; death from asthenia; family history negative; duration of disease twelve months.

Multiple growths.—1, M., æt. 11. A remarkable case of rapid development of malignant deposits. Fatal termination occurred twenty-six days after first definite appearance of symptoms; the immediate cause of death was asthenia from severe and repeated epistaxis, but marked cachexia had become manifest before this complication. The only external sign of new growth was an intra-orbital tumour, which caused protrusion of the left eye. At the autopsy diffuse soft greyish infiltrations were found in the arachnoid, dura mater, internal auditory meatus, left orbit, anterior and posterior mediastina, and in the liver and kidneys, in most of these situations distinctly following planes of cellular tissue (as, for instance, the inflections of Glisson's capsule in the liver). The microscopical elements were small spindle and oval cells, and free nuclei. The lymphatic glands did not appear to be involved.

c. Epithelial cancer.—*Lips*.—2, M. Ages 56 and 90. Disease recurrent in 1 case. No obvious local causes ascertained in either; 1 patient was a smoker, but always carried his pipe on the unaffected side of the mouth. Removal by V-incision successful in both cases.

Tongue.—5. M. 3, F. 2. Ages 43—55. R. 1, U. 3, S. 1. Lymphatic glands affected in all. In 1 case part of the growth was destroyed by galvano-cautery, and in another injections of Liquor Arsenicalis and of quinine solution were tried, and borax was administered internally, but without good effect. In the other instances alleviative treatment alone was adopted.

Penis.—2 (labourers). C. 1, U. 1. Glandular enlargement in both. No local cause known in either instance. Amputation of penis performed in each case.

General remarks.—Of the 21 cases of cancer above referred to, family history was negative in all except one, in which the sister of the patient was supposed to have died of cancer of the uterus. Cachexia was well marked in only two instances, and in the greater number was entirely absent.

Non-malignant and recurrent tumours.—*a. Fibrous*.—2. R. 1, U. 1. One in vaginal walls, the other in left buttock. No operations.

β. Fatty.—5. C. 3, S. 2. All situated either in nape of neck or on back. Removal in 3 cases.

γ. Glandular.—1, C. Of breast. Removed.

δ. Nervus.—C. 2, S. 1. Of face 2, of back 1. All subcutaneous. Excision performed in 2 cases.

ε. *Compound cystic*.—2, D. Ovarian. Ovariectomy in one case; death from general peritonitis; hæmorrhage into abdominal cavity from ruptured adhesions also found. In the second case operation was declined.

Sarcomata—

Spindle-celled.—*Of neck*.—1, F. Recurrent; excised.

Of breast.—1, F. This case presented some peculiar features. Tumour first appeared twenty-eight years before, after the cure of a mammary abscess. It slowly enlarged, and three years before the admission of the patient it presented distinctly cystic characters. In May, 1871, it had reached enormous dimensions, and was removed by excision, and was then found to consist entirely of spindle cells, presenting, however, traces of its original cystic nature; the lymphatic glands were not affected. After about a fortnight the tumour recurred as a soft spindle-celled growth, and was in July again removed. Reproduction followed almost immediately; but although the glands were still unaffected, the new material had assumed an infiltrating type, and the minute elements were entirely altered in character, the spindle cells now being replaced by multiform cells and large nuclei, packed closely in the interspaces by a distinctly alveolated stroma. The patient was removed from the hospital at her own request, and died two days afterwards. No post-mortem examination.

Round-celled.—*Of skin*.—1. Melanotic; attacked congenital mole; excised.

Of ball of thumb.—Intermuscular planes, 1; removed.

Of lower jaw.—4. C. 1, U. 3. One patient admitted 3 times; glandular enlargement; no operation. In the other case the growth, with a portion of the bone, was removed, and a good recovery followed. In this instance there was no glandular enlargement.

Fasciculated.—*Of tibia*.—1, M. Glandular enlargement in groin; leg amputated; tumour recurred in stump about 6 months afterwards.

Myeloid of metacarpal bone of thumb.—Patient not operated upon until after discharge.

Undetermined.—1. Supposed to be neuroma.

Lupus.—1, R. (face). Treated by bark and iodide of potassium.

Rodent ulcer.—1, C. (face). Excised; chloride of zinc applied to raw surface.

DISEASES OF NERVOUS SYSTEM.

Malformation.—1, R. Spina bifida in lumbar region; with paraplegia, contracted knees, and bed-sores; relief slight.

Local paralysis.—Motional paralysis with hyperæsthesia of arm; galvanism afforded no relief.

Tetanus.—C. 1, D. 2. (See Special Table.)

Neuralgia.—3. In 2 affecting sciatic nerve, in 1 following course of external cutaneous. C. 1, R. 1, U. 1.

Muscular spasm.—1. Clonic, of right side, not relieved.

Delirium tremens.—1. Barman; treated successfully with chloral.

Mania.—1. No surgical complication.

DISEASES OF EYE.

Granular lids.—C. 1, R. 1, U. 1. One case extremely obstinate, had resisted treatment for 7 years; discharged unrelieved.

Cornea (Keratitis).—2. C. 1, R. 1.

Ulcers.—5. C. 1, R. 4. Perforation in 2 cases.

Pannus.—1, U. Treated with seton.

Staphyloma cornea.—1. Front of globe removed.

Optic nerve.—*Optic neuritis*.—1, U. Cause obscure, absolute amaurosis.

Atrophy of disc.—2, U. Not associated with visceral disease; slight vertigo complained of by one patient.

Lens.—*Cataract*.—14. C. 2, R. 6, U. 6. In 2 cases congenital, in 6 cases both lenses affected; extraction operation performed in 7 cases, needle operation in two.

Eyelids.—*Ectropium*, 1. Caused by lime injury, complicated with strabismus and corneal ulceration; operation.

Within orbit.—2, C. *Strabismus convergens*. Division of both internal recti in each case.

DISEASES OF CIRCULATORY SYSTEM.

Aneurism.—*Popliteal*.—1. Treated by tourniquet pressure applied to femoral. Death occurred in consequence of the development of severe pleurisy and bronchitis during the treatment.

Brachial.—1. Near elbow. Brachial artery successfully ligatured after failure of forced flexion and tourniquet pressure.

Aneurism by anastomosis of external ear.—Posterior auricular artery chiefly affected. Cured by acupressure and subsequent galvano-cautery.

Varix of saphena vein.—6. C. 3, R. 3. Vessel obliterated by pins and ligature in four cases, rest and bandages used in two.

Phlegmasia dolens.—1, F. Left leg affected, suppuration involving the whole limb resulted, and the patient died from exhaustion. The woman was pregnant at the time of admission and was delivered of a dead child shortly after.

Hæmorrhage.—2. One case admitted for secondary hæmorrhage from temporal artery, another for reactionary hæmorrhage after circumcision. (See Special List.)

DISEASES OF ABSORBENT SYSTEM.

Lymphadenoma.—2, D. In one case the patient was a girl of 23 years of age, and had recently suffered from syphilis. Death occurred fourteen days after admission from combined asthenia and apnoea. The post-mortem examination showed enlargement of the cervical glands on the right side (forming a large tumour), and implication of the communicating chain extending under clavicle and along subclavian and brachial arteries into axilla. On the left side of the neck there was slight enlargement, extending downwards across thyroid body into anterior mediastinum, forming a mass in front of the pericardium at base of heart, surrounding origin of great vessels, but not implicating root of lung. About 2½ pints of clear fluid were found in the right pleura, and the lung was collapsed. Some syphilitic infiltration was present in the kidneys. Blood apparently normal.

In the second case there was very great enlargement of the chain of glands on each side, extending from the axilla into the neck; the lower portion of the mass on the left side had become inflamed, had suppurated, and after evacuation of the pus presented a deep ragged ulcer. General health not affected. Considerable improvement resulted from treatment, but about three weeks after admission the patient was carried off by a severe attack of erysipelas. No post-mortem examination.

Enlarged inguinal glands.—5. C. 2, R. 3.

DISEASES OF RESPIRATORY SYSTEM.

Croup.—1, æt. 1½. Threatening asphyxia. Tracheotomy performed without delay, but death occurred a few hours after operation.

Consolidation of base of left lung.—1. Case admitted into surgical wards in error.

DISEASES OF DIGESTIVE SYSTEM.

I.—LIPS.

Harelip.—2, C. Hard palate involved in both; both operated upon with success.

Fissure.—1. Excised.

II.—PALATE.

Cleft palate.—5. C. 1, R. 3, U. 1. Posterior two thirds of hard palate involved in two cases. Treated by operation in four cases; relief obtained in the fifth by adapting a false palate.

Perforation.—1. Probably syphilitic. Operation declined.

III.—ÆSOPHAGUS.

Stricture.—1. Associated with periodical vomiting. No treatment.

IV.—INTESTINES.

Hernia.—(a) *Reducible.*—1. Large scrotal hernia, easily reducible, but not to be kept in place by ordinary trusses. Relieved by modified truss.

(3) *Irreducible*.—2, R. No urgent symptoms in either.

(γ) *Strangulated*.—(1) *Inguinal*.—8. M. 7, F. 1. C. 4, R. 1, D. 3. Herniotomy performed in four cases (see Special List). Taxis with aid of hot bath and application of ice bag successful in the remaining instances. Duration of strangulation in the latter respectively, five hours, twenty-four hours, forty-eight hours, and three days.

(2) *Femoral*.—11. M. 1, F. 10. C. 8, D. 3. Herniotomy in nine case (see Table). Taxis in two instances (strangulation 4 and 12 hours respectively).

(3) *Umbilical*.—1, F. Said to have been strangulated about twelve hours. Complicated with abdominal tumour. No operation. Death thirty-six hours after admission. No post-mortem examination allowed.

Stricture of rectum.—5. C. 1, R. 4. Constriction at lower third of rectum in all. Three cases syphilitic in origin; two complicated by abscess behind sacrum. Treatment, bougies and incisions.

Malformation.—Absence of rectum in newly born infant. Colotomy. Death.

V.—ANUS.

Fistula in ano.—6. C. 3, R. 1, S. 1, D. 1. Phthisis in one case. Operation in five cases. One patient died from pyæmia after operation (see Special Table).

Hæmorrhoids.—3. C. 2, R. 1. Piles external in one case, external and internal in the others. Operation in all.

Prolapse.—1. Infant. No permanent relief; child hydrocephalic and very feeble.

Spasm of sphincter.—1. Relief by division of sphincter.

GENITO-URINARY SYSTEM.

I.—BLADDER.

Vesico-intestinal fistula.—1. Cause of fistula unknown; colotomy performed. Death from peritonitis due to rupture of adhesions between bladder and intestine.

Calculus.—7. C. 4, R. 3. Of the six calculi (one patient admitted twice) two consisted of *oxalate of lime*; one of these was small and escaped during micturition, the other was extracted by lithotomy, weight 12 drachms. *Uric acid* 1, small, impacted in urethra and removed by incision. *Triple phosphate* 1, passed during micturition. *Mixed uric acid and oxalate of lime* 1, diameter about $1\frac{1}{2}$ inch; greater part removed by lithotrity. *Mixed uric acid and urate of ammonia* 1, about size of a Spanish nut; removed by lithotomy.

Hæmaturia.—4. C. 2, R. 1, D. 1. All apparently vesical. In the fatal case hæmaturia had existed for nine months; death resulted from asthenia. No post-mortem examination.

Malformation.—1. Extroversion of bladder. Operation performed with object

of making the ureters open into the lower part of the rectum. The procedure was followed by considerable febrile disturbance and albuminuria, apparently due to extension of inflammation along ureters to kidneys. Patient re-admitted for further treatment.

Irritability of bladder.—5. C. 1, R. 1, S. 3. Causes not ascertained. Two cases transferred to medical wards.

Painful micturition.—2. R. 1, U. 1. Hysteria in one case.

Incontinence.—1, C. Child; treated with cantharides and occasional purges.

Retention.—2. Hysteria in one case.

II.—PREPUCE.

Phymosis.—4, C. 3, R. 1. All congenital; circumcision performed in two cases, prepuce slit up in the others.

III.—URETHRA.

Stricture.—39 M. C. 24, R. 9, D. 6. Complications: perineal abscess 3, perineal fistulæ 7, extravasation of urine 1, chronic cystitis 2, purpura 1, phthisis 2, albuminuria and hæmaturia 1. Five cases were admitted as emergencies for retention. The causes of death in the fatal cases were as follows: (1) pneumonia and acute cystitis; (2) acute cystitis, pyelitis, and suppurative nephritis; (3) chronic cystitis and suppuration in right kidney; (4) granular degeneration of kidneys and ulceration of bladder; (5) pyæmia; (6) phthisis. Treatment: perineal section in eight cases, sudden dilatation by Holt's instrument in 2 cases, catheterism in the rest.

Malformation.—1, R. Epispadias. Relieved by operation.

IV.—TESTES AND CORD.

Orchitis.—Acute 1, chronic 1; the former was complicated with gonorrhœa, the latter resulted from a blow.

Hydrocele.—7. C. 3, R. 1, U. 3. Paracentesis, with injections of iodine, in 2 cases; operation successful in 1.

Varicocele.—1, R. No operation.

V.—VAGINA.

Vesico-vaginal fistula.—2. C. 1, R. 1. Both resulted from tedious instrumental labours. One cured by operation.

VI.—VULVA.

Vulvitis, following parturition.—1.

VII.—FEMALE BREAST.

Abscess.—1. Cured by incision. (See Tumours also.)

ORGANS OF LOCOMOTION.

I.—BONES.

a. Periostitis.—4. C. 2, R. 2. No history of syphilis in any. Tibia affected in 3 cases, cranium in 1. Necrosis resulted in 1 case.

β. Caries and necrosis.—Of cranial bones.—2. C. 1, R. 1. One case complicated with deep ulceration of posterior fauces; syphilis denied; internal remedies ineffectual, but several sequestra were rapidly detached after repeated application of dilute sulphuric acid. This patient has been readmitted. In the other case the necrosis resulted from a blow; sequestrum removed.

Lower jaw.—1, C. Followed fracture.

Clavicle.—1, C. Cause doubtful; attributed to blow. Nearly whole of shaft destroyed, but sternal epiphysis not involved; sequestrum removed.

Humerus.—2. C. 1, R. 1. Upper epiphysis affected in 1 case; dead bone did not become detached while the patient was under treatment. In the other case the whole shaft perished from acute osteitis, and was removed by operation.

Ulna and radius.—3. C. 1, R. 2. Caries of olecranon in one case, necrosis of lower end of radius in the others.

Bones of hand.—5. C. 4, R. 1. Caries of metacarpal bones 1. In this case the phalanges of the great toe were also diseased, and operation had previously been performed for disease of elbow and knee-joints. In the remaining cases the phalanges were necrosed.

Pelvic bones.—3. U. 1, D. 2. Necrosis superficial in all the cases. In 1 the left ilium was extensively bared, in another the ilium, ischium and sacrum, were eroded, in the third the ilium was diseased and the sacro-iliac joint implicated. One patient died from meningitis and pulmonary phthisis, another from general peritonitis due to extension of inflammation from the seat of disease, the third case was sent to Margate unrelieved.

Femur.—9. C. 1, R. 6, S. 1, D. 1 (one case admitted three times). Popliteal surface affected in 2 cases, cancellous portion of lower extremity in 2, shaft in 3. Progress very tedious in all. Sequestra removed in 4 cases. In the fatal case knee-joint excision had been performed about two years before, but caries attacked the lower extremity of the femur. The limb was amputated, and death occurred nine days afterwards from asthenia. Post-mortem examination showed amyloid disease of liver and spleen, fatty degeneration of both kidneys, several calculi in the pelvis of the right kidney, caries of second lumbar vertebra, and psoas abscess. No symptoms of spinal disease had been manifested during life.

Patella.—1, C. External surface of bone bared.

Tibia.—8. C. 5, R. 3. Sequestra removed in 7. Necrosis due to compound fracture in 1 case (admitted twice), in the rest the causes were obscure.

Fibula.—1, C. Sequestrum removed.

Bones of foot.—5. C. 1, R. 3, S. 1. Caries of os calcis 1, of astragalus 1, of scaphoid 1, necrosis of metatarsal bones 2. Three cases treated by incision.

II.—JOINTS.

Acute synovitis.—8. C. 7, R. 1. Traumatic in origin. Affecting knee-joint in all.

Chronic synovitis.—1, C. Knee.

Ankylosis.—(1) *Elbow*.—2, R. Traumatic in origin. Forcible extension only partially successful.

(2) *Hip*.—1, D. Fibrous. Result of arthritic disease. Subcutaneous section of neck of femur performed; death from pyæmia.

(3) *Knee*.—1. Fibrous. Not relieved.

Abscess.—2, C. Knee-joint. Result of injury. Treated by incision; subsequent amputation required in 1 case.

Dropsy.—1, R. Knee. Origin obscure. Treated with discutients; progress very slow.

Loose cartilages.—1, R. Knee. No operation.

Other diseases.—(Synovial membrane, Cartilage, Bone, &c.)

(1) *Elbow*.—2. R. 1, D. 1. Causes obscure. Excision performed in 1 case; operation declined in the other. Patient died from exhaustion soon after admission.

(2) *Wrist*.—1, C. Joint excised. This patient was also the subject of necrosis of femur.

(3) *Sacro-iliac synchondrosis*.—1. Complicated with phthisis; not relieved.

(4) *Hip*.—23. C. 2, R. 13, U. 2, S. 4, D. 2. Both joints affected in 2 cases; 2 cases complicated with disease of pelvic bones (beyond acetabulum). In 1 case true dislocation, apparently without formation of pus, had occurred during scarlet fever; the displacement could not be remedied.

In 12 cases the disease was advanced, the bone being shortened and supuration having taken place; in 4 of these the bone was primarily affected, in the other the affection appeared to have originated in the joint. Operations for the removal of sequestra were performed in two cases, excision of the joint in one, and amputation of the thigh in a fourth. Two patients died while under treatment, one from tubercular meningitis, the other from shock after amputation. American extension was used with good result in the majority of the cases.

(5) *Knee*.—36. C. 15, R. 9, U. 6, S. 3, D. 3 (4 cases admitted twice, 1 three times). Excision of joint was performed in 8 cases (see Special List for nature of disease, &c.). Amputation in 6 cases, in 3 of which disease apparently originated in the synovial membrane, and attacked bone and cartilage secondarily; in 2 the tibia and femur were carious; in the sixth abscesses were found in the tibia and femur.

Complications.—Phthisis in 3 cases (amputation performed in one of these, excision in another). The causes of death in the fatal cases were in one phthisis and exhaustion, in another pyæmia, and in the third shock of operation.

(6) *Ankle*.—7. R. 6, D. 1. Disease originated in bone in two cases, probably in synovial membrane in 5. Amputation performed in one case, sequestrum removed in one. In the fatal case death resulted from pyæmia.

(7) *Tarsus*, &c.—7. C. 1, R. 4, S. 1, D. 1. Syme's amputation performed in 2 cases; diseased bone removed from scaphoid in 1; tarso-metatarsal joint excised in 1; toe amputated in 1. One patient died from tetanus after amputation of foot.

III.—SPINE.

Carics.—7. R. 1, S. 3, D. 3. Cervical region in 1 case, lumbar region in the others; psoas abscess in 2 cases.

Complications.—1 morbus Addisonii, 1 albuminuria.

Causes of death in 3 fatal cases.—(1), exhaustion; (2), morbus Addisonii, tubercle (?) found in supra-renal capsules and lungs, strumous abscesses in left kidney; (3), albuminuria and exhaustion.

Angular deformity.—1, R. Special apparatus applied.

IV.—TENDONS AND FASCLE.

Contraction of plantar fascia.—1. Relieved by subcutaneous section of contracted bands, case complicated with talipes equinus.

Club-foot—

Talipes varus, double.—1, U. Tenotomy.

Talipes equino-varus, double.—1, C. Tenotomy.

T. equinus.—1, U.

Wry neck.—2, R. Congenital deformity; affected face in 1 case, the eye on the affected side being on a lower level than its fellow. Apparatus applied in both cases, in 1 after division of tendon, and produced considerable improvement.

V.—APPENDAGES OF THE MUSCULAR SYSTEM (RURSE).

Bursa patellæ (simple enlargement).—5, C. Four in domestic servants. Treated by rest and discutients.

Bursa over great trochanter (simple enlargement).—1, R. Tapped.

Bursa over ankle, inner malleolus (enlargement).—1, R. Dissected out.

Inflamed bursa patellæ.—1, C.

Bursal abscess.—7, C. Caused probably by kneeling upon damp floors in six cases, by a blow in the seventh; all treated by incision.

VI.—MALFORMATION.

Supernumerary finger.—Amputated.

DISEASES OF CELLULAR TISSUE.

Abscess.—34. C. 18, R. 8, U. 2, S. 4, D. 2.

Chronic.—5. Of thorax 2, thigh 2, iliac region 1.

Acute.—29. Of neck 2, thorax 3, loins 1, ischio-rectal fossa 1, axilla 2, hand 4, groin 1, lower extremity 15. In 2 cases the abscess was probably intra-pelvic in origin. The chronic abscesses were treated either by valvular incisions or by the pneumatic aspirator; the acute cases by incisions, poultices, &c. Two patients suffering from large abscesses in thigh died from exhaustion; no post-mortem examination.

Sinus.—6. C. 3, R. 2, U. 1. Followed simple abscess in 2 cases, bone disease in 1, amputation of thigh in 1, Syme's amputation in 1, amputation of finger in 1. Treated by stimulant injections and by pressure.

DISEASES OF CUTANEOUS SYSTEM.

Erythema.—3, C. Leg.

Psoriasis.—1. P. guttata and diffusa of upper extremities. Transferred to medical wards.

Eczema.—5. C. 2, R. 3. Chronic eczema of lower extremities 3, of dorsum of hand 1, eczema rubrum of leg 1.

Superficial sloughs.—1, C., æt. 78. Small circumscribed sloughs on lower extremities, preceded by purpurous eruptions, the extravasations apparently destroying the vitality of the skin.

Ulcers.—35. C. 27, R. 6, S. 2.

Seat.—(a) *Leg* in 25. 16 of these were without apparent cause, 5 resulted from direct contusion, 1 from a graze, 1 from a burn, and 1 from a gunshot wound.

(β) *Knee.*—3. 1 strumous, 1 atonic, and 1 traumatic.

(γ) *Toes.*—1. Atonic, limb paralysed and atrophied.

(ε) *Upper lip.*—1. Probably syphilitic.

(ξ) *Neck.*—1. Strumous.

(η) *Behind ear.*—1. Strumous?

(θ) *Elbows and foot.*—1. Strumous.

(ι) *Arm.*—1. Traumatic.

(κ) *Soles of feet.*—1. Caused by abnormal pressure in consequence of old dislocation of metatarsus.

Treatment in nearly all the cases consisted of rest, with local application of water dressing and stimulating ointments.

Carbuncle.—5, C. Three on neck, 1 on epigastrium, and 1 on shoulder. Age ranged from 45 to 61. Patients all in feeble health, but none suffering from diabetes, renal disease, or, apparently, from any other internal affection.

Treated by limited incisions in 4 cases.

Bed-sore.—1. Deep. Death from exhaustion.

Cicatrix.—2. C. 1, U. 1. Deformity of face and neck, from burn, 1; eversion of lower lip, from same cause, 1. Operations in both—failed in former, successful in second.

GENERAL INJURIES.

Burns.—19. C. 10, D. 9. Caused by contact of ordinary flame in 14; in the other 5 respectively, by molten iron, molten antimony, gunpowder, fireworks, and saltpetre. Causes of death in 9 fatal cases—shock in 6; apnœa, from secondary bronchitis, in 1; exhaustion, 8 to 10 days after admission, in 2. No post-mortem examinations.

Nearly all the cases were treated locally by the application of a paste of chalk and acetic acid, covered in with cotton wool.

Scalds.—18. C. 17, D. 1. Involving different parts of trunk and extremities in 16, pharynx in 1, and mouth in 1. Tetanus followed in 1 case, and was cured by chloral hydrate. One patient died from shock a few hours after admission.

MULTIPLE INJURY.

1. Male. Scalp wound, concussion, fracture of rib, fracture of humerus, injury to jaw; run over. Death from shock.

2. Male. Fracture of all the ribs on left side with injury to pleura and lung, fracture of two ribs on right side, compound fracture of tibia and fibula, wound of ankle-joint, coma; machinery accident. Death from shock.

3. Male. Fracture of body of right scapula, several ribs on right side, neck of left humerus, contusions; caused by fall from scaffold. Recovery.

4. Female. Fracture of left clavicle and of eight or nine ribs on left side, severe contusions; caused by a fall down stairs. Recovery.

5. Male. Compound comminuted fracture of right femur, dislocation of left humerus, contusions; run over. Recovery.

6. Male. Fracture of right tibia and fibula, fracture of radius, laceration of temple; fall. Recovery.

LOCAL INJURIES.

HEAD.

Scalp wound.—(a) *Bone not exposed*.—17. C. 13, R. 3, D. 1. In the fatal case death was due to suddenly developed pericarditis and pleurisy supervening upon an attack of erysipelas; the post-mortem examination revealed, in addition, congestion of brain, with subarachnoid effusion and commencing granular degeneration of kidneys.

(b) *Bone exposed*.—4, C. No exfoliation in any.

Concussion of brain.—21. C. Scalp wounds in 13. Injury very severe in one case; almost complete insensibility lasted for some days after the accident, and merged into symptoms of "cerebral irritation," accompanied by epileptic fits. This condition gave place to a peculiar form of aphasia (see 'St. Thomas's Hospital Reports,' 1871). The effects of the cerebral injury were complicated with intercurrent attacks of erysipelas and variola. The case ultimately did well. In a second case unilateral muscular twitchings, lasting for some days, resulted from the injury.

Fracture of vault of skull.—(a) *Without depression.*—4. C. 2, R. 1, S. 1. All compound and fissured.

(b) *With depression.*—2. C. 1, D. 1. In the fatal case, that of an infant, who had fallen from a high window, death resulted from shock and compression; fracture not compound. In the other case, a compound fracture of the squamous portion of the temporal bone, the patient suffered from concussion and strabismus, but was eventually cured.

Fracture of base of skull.—5. C. 3, R. 1, D. 1. In the fatal case the post-mortem examination showed fracture through the petrous portion of the temporal bone into posterior fossa; ventricles of brain and whole subarachnoid space (brain and cord) filled with pus; structure of centres not greatly altered. The injury was caused by a blow with a stick on the back of the head. The symptoms were, at first, cerebral oppression, without unconsciousness or marked loss of intelligence, subsiding into partial coma; with opisthotonos, violent convulsive attacks, and high temperature. Death occurred on the ninth day.

In the other cases the diagnosis was conjectural; the symptoms in the individual cases were as follows:

1. Long-continued vertigo; paralysis of left facial nerve; and marked intellectual impairment, commencing with a form of delirium and sinking into obtuseness and imperfect memory, probably permanent. Cause of injury was a fall from the top of an omnibus, the vault of the cranium striking the ground.

2. Severe concussion; bleeding from right ear, followed by serous oozing; persistent headache; and deafness. Cause—knocked down, head striking ground.

3. Severe concussion; much hæmorrhage from left ear. Cause—fall from a van, head striking ground.

4. Bleeding from left ear, followed by serous oozing of some days' duration; no marked head symptoms. Cause—fall down stairs.

Contusion of brain.—1. D. Patient knocked down by a blow with a fist; the symptoms were inability to speak or write, although consciousness was not destroyed, and epileptoid fits; no paralysis. Death two days after admission. Autopsy showed contusion of posterior part of left posterior lobe of brain, and effusion of blood on surface at this point, corresponding to the place struck by the fist; there were also contusion of right anterior lobe and fracture of right temporal bone (without depression), probably produced by the fall.

Face.—*Contusion.*—8. C. 7, R. 1. None important.

Wound.—9. C. 7, R. 2. None important.

Fracture of lower jaw.—5. R. 3, S. 2. All compound, and implicating body.

Exfoliation followed in 1 case; in another no union took place, and the patient was readmitted a few weeks after discharge; an attempt to produce union was made by sawing off the broken ends of the bone, but death from phthisis pulmonalis followed a few days afterwards.

Eye.—Contusion of globe.—10. Resulted in suppuration and complete destruction of eye.

Wound of cornea.—3. C. 1, R. 2. Prolapse of iris in 2.

Wound of lens.—1, C. Caused by blow; lens extracted.

Complicated wounds.—5. (1) Laceration of sclerotic, retina, and vitreous, followed by shrinking of globe. (2) Laceration of cornea and iris. (3) Laceration of cornea, with escape of lens. (4 and 5) Laceration of cornea and lens; lens extracted in one of these, but the globe subsequently became shrunken.

Chemical injury (lime).—1, C. Severe conjunctivitis.

NECK.

Contusion of soft parts.—1.

Wound.—1, C. Cut throat; division of thyro-hyoid membrane; no important vessels or nerves injured.

Foreign body in air-passages.—1, C. Piece of apple accidentally drawn into trachea; tracheotomy performed, and instant relief to the symptoms of threatening asphyxia given.

Injury to pharynx and glottis (by corrosives).—1, C. Carbolic acid accidentally swallowed; severe dyspnœa; relieved without operation.

CHEST.

Contusions.—8, C. None important.

Fracture of ribs.—Simple.—10, C. Hæmoptysis in 2 cases.

Complicated.—1, R. Followed by pleuritic effusion and partial consolidation of left lung; caused by fall from a cart.

Fracture of sternum.—1, C. At level of third rib; chest crushed by a waggon.

Wound.—1, C. Stab, apparently quite superficial.

Gunshot wound.—1, C. Complicated with variola; bullet not extracted; apparently encysted in right lung.

BACK.

Contusions.—12. C, 11, S. 1. Hæmaturia in 1 case.

Sprain.—1, C. Not severe; due to lifting a heavy weight.

Fracture of spine.—2. C. 1, D. 1. In the fatal case the fifth and sixth cervical vertebræ were fractured and the cord crushed; death resulted two days after injury, from combined apnœa and asthenia. In the other case there was distinct depression of the spinous process of the third lumbar vertebra; the patient was paraplegic on admission, but power and sensation completely returned about five

days afterwards. Injury in both cases caused by fall from height of about fifteen feet.

Injury of cord without obvious fracture.—5, R. (one case admitted twice). Injury caused by fall from a height in all. The symptoms were as follows in the respective cases:

1. Partial motor paralysis of lower extremities. Relieved.
2. Partial motor paralysis of lower extremities, complete paralysis of bladder, tenderness over lower dorsal and upper lumbar spines. Considerably relieved by strychnia.
3. Complete motor paralysis (temporary) of lower extremities, partial motor paralysis of upper extremities and intercostals, pain and hyperæsthesia in shoulders. The patient, when seen some months after discharge, suffered from great muscular weakness and complete loss of virile power.
4. Motor paralysis, with hyperæsthesia of left leg (partly relieved), partial motor paralysis of right leg, both arms, and intercostals (almost entirely relieved).

ABDOMEN.

Contusion.—5, C. Considerable shock in 1 case.

Visceral lesion.—3. C. 1, D. 2. Death in 1 case resulted from shock, about half an hour after the injury; no post-mortem examination; the patient was a child, and had been run over by a heavy cart. In the other fatal case the patient lingered for five days; post-mortem examination showed extensive rupture of liver, with extravasation of bile and blood, and resulting peritonitis; the wounds in the liver were found to be sealed by clots; the injury was caused by a fall of earth upon the man.

In the case followed by recovery visceral injury was suspected, on account of the length and severity of the shock and the existence of repeated vomiting. The patient, a child ten years of age, had been run over by a light cart.

PELVIS.

Contusion.—2, C. One case serious.

Wound of scrotum.—1, C. Caused by fall upon a pointed piece of wood.

Laceration of urethra.—1, C. Caused by fall across a fence, followed by obstinate stricture.

Fracture.—Simple.—1, C. Horizontal ramus of pubes. Caused by fall from height.

Complicated.—1, D. Left ilium. Caused by fall from height; post-mortem showed laceration of small intestine and escape of fæces into abdominal cavity, with resulting peritonitis. Death occurred about thirty-six hours after admission.

UPPER EXTREMITY.

Contusion.—1, C. Elbow. Threatening ankylosis of joint.

Sprain of wrist.—1, C.

Wound.—8. C. 7, R. 1. Four incised, 4 lacerated.

Wound of wrist-joint.—1, C. Incised.

Separation of epiphysis (humerus).—2, C. Both in children. Upper epiphysis separated from shaft.

Fracture.—Clavicle.—2. C. 1, R. 1. Both fractures at greater curve, and by indirect violence.

Scapula.—1, R. Body. Direct violence.

Humerus.—Simple.—5, C. Three at surgical neck, 2 in middle third.

Compound and complicated.—2. C. 1, D. 1. Compound comminuted fractures into elbow-joint, 1 caused by railway accident, the other by machinery. Primary amputation performed in the former, secondary amputation in the latter (death from pyæmia).

Forearm.—Simple.—1, R. Colles' fracture.

Compound.—2, C. Direct violence. Radius in one case, ulna in the other.

Compound and complicated.—2. C. 1, D. 1. In the fatal case the fracture extended through the olecranon into an ankylosed elbow-joint; injury caused by a fall. Resection of the fractured ends was performed, profuse suppuration followed, and death from exhaustion ensued.

Carpus, &c.—4. All crushed hands. Amputation at wrist-joint performed in one case, above wrist in one, of fingers in two.

Multiple fracture of upper extremity.—2. 1, comminuted fractures of humerus and radius, simple fracture of ulna and crush of third, fourth, and fifth fingers; machinery accident. 2, compound fracture of left humerus, simple fracture of right humerus, and compound fracture of little finger. Angular deformity of right arm resulted, and a sequestrum subsequently exfoliated.

Dislocation.—Acromio-clavicular joint.—1. From fall; reduced.

Shoulder.—2, C. Axillary; reduced.

Thumb.—1. Metacarpal phalanx backwards upon metacarpal bone; not reduced.

LOWER EXTREMITY.

Contusions.—18. C. 16, R. 1, D. 1. In the fatal case the injury, a severe contusion of the foot, was followed by gangrene extending as high as tarso-metatarsal joints, and by suppuration in ankle and tarsal joints. Syme's amputation was performed, but death ensued in a few days from asthenia.

Sprains and slight injuries to joints.—15. C. 12, R. 3. None severe. The injury involved hip in 1 case, knee in 7, and ankle in 7.

Wounds.—10, C. Of these, 9 were lacerated, 1 incised.

Wounds of joints.—3, C. Particulars as follows:

1, M., æt. 25. Incised wound into right knee-joint; closed at once with collodion; recovery complete.

2, M., æt. 30. Lacerated and contused wound opening left knee-joint, followed

by serious constitutional disturbance and profuse suppuration ; course very tedious, but ultimately terminated by ankylosis.

- 3, M., æt. 27. Punctured wound of left knee-joint ; closed at once with colodion ; recovery complete.

Green-stick fracture.—1. Patient, æt. 12, run over by heavy cart ; green-stick fracture of tibia and fibula about middle of leg ; some deformity remained after cure.

Fractures.—

Femur. A. *Simple.*—30. C. 28, S. 1, D. 1.

- α. *Neck.*—3, C. Two *intracapsular*, patients æt. 75 and 79 respectively ; injury caused by a fall upon hip ; treated by double inclined plane. One *extracapsular*, patient æt. 40 ; direct violence ; treated by long outside splint.
- β. *Upper third.*—4. Caused by direct violence in 1 case ; fracture impacted in 1 case ; treated by long outside splint ; union good in all.
- γ. *Middle third.*—19. Caused by direct violence in 3 cases ; 1 patient died from variola. Treated by long outside splint, with perineal or American extension.
- δ. *Lower third.*—6. Caused by direct violence in 1 case. Treated by flexed Liston splints and long outsides ; American extension found very serviceable.

B. *Comminuted.*—1, C. In upper third, caused by a kick from a horse ; treated by long outside splint.

C. *Complicated.*—3, C. Fractures extending through condyles into knee-joint ; treated by flexed back splints ; cure complete in 2 cases ; in the third the joint remained very stiff after union.

Patella.—6, C. All transverse. In 3 cases the lesion was undoubtedly due to muscular action, in 2 to direct violence, in the 6th the direct cause was uncertain ; all treated by straight back splints and elevation of the limb ; followed, when swelling had subsided, by application of immovable apparatus. Union good, line almost imperceptible, except in 1 case, in which the fragments were separated by an interval of three quarters of an inch.

Leg.—A. *Tibia and Fibula.*

Simple.—26. C. 25, R. 1.

The seat of fracture in 17 cases was at the junction of the middle and lower thirds, in 2 in the middle third, in the rest in the lower third ; one of the latter was a Pott's fracture.

Compound.—3. C. 2, D. 1.

Seat of fracture in all at junction of middle and lower thirds. Cause, direct violence in 1 case (fatal), indirect in the others. In the fatal case the fracture became compound by sloughing of the integuments over the broken ends ; death

resulted from pyæmia. Treated by Liston splints; in the 2 cases which recovered the wounds were small, and were closed readily by means of collodion.

Compound and comminuted.—1, C.

Both bones comminuted in middle third. An attempt was made to save the limb, but profuse suppuration, exfoliation of bone, and at length secondary hæmorrhage from anterior tibial artery followed, and amputation became necessary.

B. *Tibia alone.*—*Simple.*—2, C. Seat of fracture in 5 at junction of middle and lower thirds, in 2 on middle third, in 1 at malleolus, and in 1 at junction of middle and upper thirds. Injury caused by direct violence in 1 case.

Compound.—1, C. Malleolus only. Run over.

All treated by Liston's or short outside splint.

C. *Fibula alone.*—15. C. 13, R. 2. All in lower third; 2 from direct violence. Treated by short outside or Liston splints.

Foot.—6, C. Fracture of astragalus from fall upon heel in 1 case, in the remaining 5 the feet were crushed by heavy weights. Syme's amputation required in 1, amputation of toes in 2 others.

Multiple fractures of lower extremity.—1, D. Compound fracture of right femur, simple fracture of left femur, and compound fracture of left tibia and fibula. Double amputation of thighs performed. Death from shock.

Dislocations.—

Hip-joint.—Dorsal 1. Caused by fall while the patient was tipsy. Reduced by manipulation.

Ankle-joint.—1. Complicated with fracture of fibula. Displacement of foot backwards.

MEDICAL OFFICERS
OF
St. Thomas's Hospital.

HONORARY CONSULTING PHYSICIANS.

T. A. BARKER, M.D. CANTAB. ET EDIN., F.R.C.P.
J. RISDON BENNETT, M.D. EDIN., F.R.C.P.

PHYSICIANS.

T. B. PEACOCK, M.D. EDIN., F.R.C.P.; J. S. BRISTOWE, M.D.
LOND., F.R.C.P.; E. CLAPTON, M.D. LOND., F.R.C.P.;
C. MURCHISON, M.D. EDIN., F.R.C.P., F.R.S.

OBSTETRIC PHYSICIAN.

R. BARNES, M.D. LOND., F.R.C.P.

SURGEONS.

F. LE GROS CLARK, Esq., F.R.C.S., F.R.S.; JOHN SIMON, Esq.,
F.R.C.S., F.R.S., D.C.L.; SYDNEY JONES, Esq., F.R.C.S.;
JOHN CROFT, Esq., F.R.C.S.

OPHTHALMIC SURGEON.

R. LIEBREICH, Esq., M.R.C.S.

ASSISTANT PHYSICIANS.

W. H. STONE, M.B. OXON., F.R.C.P.; W. M. ORD, M.B. LOND.,
M.R.C.P.; J. HARLEY, M.D. LOND., F.R.C.P.;
J. F. PAYNE, M.B. OXON., M.R.C.P.

ASSISTANT OBSTETRIC PHYSICIAN.

H. GERVIS, M.D. LOND., M.R.C.P.

ASSISTANT SURGEONS.

WILLIAM MAC CORMAC, Esq., F.R.C.S.; F. MASON, Esq., F.R.C.S.;
HENRY ARNOTT, Esq., F.R.C.S.

DENTAL SURGEON.

J. W. ELLIOTT, Esq., M.R.C.S.

RESIDENT ASSISTANT PHYSICIAN.

G. H. EVANS, M.D. CANTAB., M.R.C.P.

RESIDENT ASSISTANT SURGEON.

W. W. WAGSTAFFE, Esq., F.R.C.S.

APOTHECARY.

Mr. W. R. JONES.

ANALYTICAL CHEMIST.

ALBERT J. BERNAYS, M.A., PH.D.

LECTURERS

OF

St. Thomas's Medical College.

Dr. PEACOCK	}	...	...	Medicine.
Dr. MURCHISON				
Mr. LE GROS CLARK	}	...	...	Surgery.
Mr. SYDNEY JONES				
Dr. BRISTOWE		...	...	General Pathology.
Mr. F. MASON	}	...	...	Descriptive Anatomy.
Mr. W. W. WAGSTAFFE				
Dr. ORD	}	...	...	General Anatomy and Physiology.
Dr. JOHN HARLEY				
Mr. LIEBREICH		...	...	Ophthalmic Surgery.
Dr. BERNAYS		...	...	Chemistry, and Practical Chemistry.
Dr. BARNES		...	...	{ Midwifery, and the Diseases of Women and Children.
Dr. STONE		...	...	Physics and Natural Philosophy.
Dr. CLAPTON		...	...	Materia Medica, and Therapeutics.
Dr. STONE	}	...	...	Forensic Medicine and Hygiene.
Dr. GERVIS				
Mr. A. W. BENNETT		...	...	Botany.
Mr. C. STEWART		...	...	Comparative Anatomy.
Dr. WM. RHYS WILLIAMS		...	...	Mental Diseases.
Dr. PAYNE	}	...	...	Morbid Anatomy.
Mr. H. ARNOTT				

Mr. A. HAVILAND will deliver a Course of Lectures on the
Geographical Distribution of Diseases.

TEACHERS OF PRACTICAL SUBJECTS.

Dr. ORD	}	...	...	Practical Physiology.
Dr. HARLEY				
Dr. BERNAYS		...	...	Practical Chemistry.
Mr. CROFT	}	...	...	Practical and Manipulative Surgery.
Mr. MAC CORMAC				
The ANATOMICAL LECTURERS: }				
Mr. RAINEY				Demonstrations in Anatomy.
Mr. ANDERSON and ASSISTANTS				
Dr. PAYNE	}	...	...	Demonstrations of Morbid Anatomy.
Mr. HY. ARNOTT				

REGISTRARS.

Medical—Mr. W. S. GREENFIELD. *Surgical*—Dr. CREIGHTON.

CURATOR OF THE MUSEUM.

Mr. C. STEWART.

LIBRARIAN.

Mr. E. H. DENISON.

MEDICAL SECRETARY.

Mr. WHITFIELD.

DEAN OF THE MEDICAL SCHOOL.

Dr. PEACOCK.

FEES FOR ATTENDANCE ON THE LECTURES AND ON THE PRACTICE OF THE HOSPITAL.

The Admission Fee to Hospital Practice and Lectures is £40 for the first year, a similar sum for the second, £20 for the third, and £10 for each succeeding year; or £105 at one payment, for unlimited attendance.

Gentlemen entering at St. Thomas's in the second year of their Studentship pay £40 for that year; £25 for the third year; £15 for the fourth year; and £10 for each succeeding year. Students entering in their third year pay £30; for the next year £15; and for every succeeding year £10.

The Fee for attendance on the general subjects required of Students in Dental Surgery is for the two years £45, or by instalments £40 for the first year, and £10 for the second year.

The Winter Session will terminate on the 31st of March.

The Summer Session will commence on the 1st of May, and terminate on the 31st July.

*The different Courses of Lectures, or the Hospital Practice, may also
be attended separately on the following terms :*

For Medical and Surgical Practice.

Either Medical or Surgical.	Combined on one Payment.
Three months 5 Gs.	Three months 8 Gs.
Six ditto 9 „	Six ditto 14 „
Nine ditto 12 „	Nine ditto 19 „
Twelve ditto 15 „	Twelve ditto 24 „
Perpetual 25 „	Perpetual 40 „

Fees for separate attendance on practice in Diseases peculiar to Women, Ophthalmic Surgery, and Dental Surgery, for three months, 2 Guineas.

For Lectures and Demonstrations.

1 Course. Perpetual.

Medicine, Surgery, Physiology, Anatomy, Dissections, Chemistry	5 Gs.	8 Gs.
Midwifery	4 „	6 „
Materia Medica, Botany, Physics, Forensic Medicine, General Pathology, and Comparative Anatomy	3 „	4 „
Mental Diseases, Ophthalmic Surgery, Dental Surgery, Geographical Distribution of Disease	2 „	3 „
Practical Chemistry, Practical Surgery, Practical Physiology	3 „	

*Classes for the Preliminary Scientific Examination of the University of London
are held from January to July on the following subjects :*

Mechanical and Natural Philosophy	Dr. STONE.
Chemistry and Practical Chemistry	Dr. A. J. BERNAYS.
Zoology and Comparative Anatomy	Mr. C. STEWART.
Botany	Mr. A.W. BENNETT.

Fees to Students of the Hospital, 6 guineas.

Fees to others 10 „

Fee for any single subject 3 „

Extra Charges and Expenses.

The perpetual ticket admits to only one course of Practical Chemistry, and each Student attending the Class will be required to pay a fee of a Guinea and a half, as a contribution towards the cost of material used by him, and of instruments supplied.

Each Student attending the Class of Practical Physiology will be required to pay a fee of One Guinea for the use of articles supplied. It will also be necessary that he shall be provided with a Microscope.

Each Student attending the Course of Practical and Manipulative Surgery will be required to pay for the parts of the bodies upon which he may himself operate, at the same rate as for subjects for dissection.

The Clinical Clerks must provide themselves with a Stethoscope and Registering Clinical Thermometer, and the Dressers are required to have a Pocket Case of Instruments and a Case of Silver Catheters.

Each Student wishing to make use of the Library will be required to pay a fee of One Guinea for the whole period of his Studies at the Hospital.

The fee for Students attending the course of Practical Chemistry for nine months is 25 Guineas, and for shorter periods 3 Guineas per month.

Instruction in Pharmacy and Pharmaceutical Manipulation, to meet the requirements of the Royal Colleges of Physicians and Surgeons, and of the Society of Apothecaries, is given in the Dispensary of the Hospital by the Apothecary, Mr. R. W. JONES. The fee for this course of instruction is 5 Guineas for three months.

PRIZES, APPOINTMENTS, AND OTHER HONORARY DISTINCTIONS.

The WILLIAM TITE SCHOLARSHIP, founded by Sir W. Tite, C.B., M.P., F.R.S., and consisting of the interest arising from £1000 Consols, is awarded every third year. It is given to the Student who proves, on examination in the first year's professional subjects, to be the most meritorious; and is tenable for *three years*, provided the gainer of it be well-conducted and continue in actual attendance as a pupil of the School. In case of *equality* between Students, preference is to be given to a son of a Medical man, more particularly of one who has been educated at St. Thomas's Hospital, or is in practice in Bath. This Scholarship will be awarded at the end of the present Winter Session. The following Prizes will also be given:

To the First Year's Students :

WINTER.—1st, a Prize of £20; 2nd, ditto, £15; 3rd, ditto, £10.
SUMMER.—1st, a Prize of £15; 2nd, ditto, £10; 3rd, ditto, £5.

To the Second Year's Students :

WINTER.—1st, a Prize of £20; 2nd, ditto, £15; 3rd, ditto, £10.
SUMMER.—1st, a Prize of £15; 2nd, ditto, £10; 3rd, ditto, £5.

To the Third Year's Students :

WINTER.—1st, a Prize of £20; 2nd, ditto, £15; 3rd, ditto, £10.

Students of each year are classed according to their respective merits in the examinations; those in the *first* class in each year receive Certificates of Honour.

All Students have the opportunity afforded them of being engaged in the performance of practical duties in connection with the Medical, Surgical, Obstetrical, Ophthalmic, and Pathological Departments of the Hospital.

Clinical Clerks and *Dressers* continue in office for three or six months. Those who distinguish themselves by their diligence and by the accuracy of their reports will receive Certificates of Honour. The Dressers, during their period of attendance in the Hospital, are provided with Rooms and Commons free of expense.

Obstetric Clerks are from time to time appointed. Each holds office for a fortnight, and during this period is provided with Rooms and Commons in the College House.

Certificates of Honour are awarded to those Gentlemen who have satisfactorily attended Thirty cases of Midwifery.

Two or more Gentlemen are selected from Students who have completed their Second Winter Session, to act as Assistants in the Dissecting Rooms, and receive Certificates of Honour for their services if satisfactorily performed.

The *Cheselden Medal*, founded by *George Vaughan*, Esq., is annually awarded to the Student who most distinguishes himself in a practical Examination in Surgery and Surgical Anatomy.

The *Treasurer's Gold Medal* for General Proficiency and Good Conduct is awarded to the Student who has passed through his pupilage in the most meritorious manner.

The *Grainger Testimonial Prize*, of the value of Twenty Pounds, is awarded biennially to 3rd or 4th year's Students, for the best Physiological Essay, to be illustrated by preparations and dissections. Competitors for this Prize must be Medical Students of St. Thomas's Hospital, and on the day of sending in their Essays, Dissections, and Preparations, shall have completed the Second, but not the Fourth, year of their medical studies.

Two House Physicians, *Two House Surgeons*, and a *Resident Accoucheur*, are selected from Gentlemen who have obtained their professional diplomas; they hold office for three or six months; and are provided with Rooms and Commons.

Two Hospital Registrars, at an annual Salary of £40 each, are appointed in each year. Preference will be given to Gentlemen who have been distinguished for merit, and have completed their studies in the School. The payment of the Registrars is subject to the presentation of a Report upon the Practice of the Hospital, and to such Report being regarded as satisfactory by the Medical Officers to whom it shall have been referred.

Students have access, with the permission of the Officers under whose superintendence they are placed, to the Museums of Human and Comparative Anatomy and Pathology—of Materia Medica—of Botany—and of Chemistry and Mineralogy—and to the Laboratories of Practical Physiology and Practical Chemistry.

LIST OF STUDENTS

WHO HAVE OBTAINED

Honours in the Annual Examinations.

The Addresses are those given at the time of Entry.

ADDY (B.), West Deeping, Lincolnshire.

- 1869. 1st Year Student, 1st College Prize ;
Physical Society's 1st Year's Prize.
- 1870. 2nd Year Student, 1st Coll. Prize.
- 1871. 3rd Year Student, 1st Coll. Prize.
Prosecutor's Prize ;
Treasurer's Gold Medal.

ALLINGHAM (W.),* Bermondsey.

- 1852. Descriptive Anatomy, Hon. Cert. ;
Chemistry, Hon. Cert. ;
- 1853. Midwifery, Hon. Cert.
- 1854. Medicine, Hon. Cert. ;
Descriptive Anatomy, Prize ;
Midwifery, Hon. Cert. ;
Physical Society's Essay, Prize
Surgery, Prize ;
Physiology, Hon. Cert.
- 1855. Medicine, Prize ;
Descriptive Anatomy, Hon. Cert. ;
Physiology, Hon. Cert. ;
Clinical Medicine, President's Prize ;
Clinical Medicine, Treasurer's Prize.

ANDERSON (W.),† Clapham, Surrey.

- 1865. 1st Year Student, 3rd Coll. Prize.
- 1866. 2nd Year Student, 3rd Coll. Prize.
- 1867. 3rd Year Student, 1st Coll. Prize ;
Physical Society's 3rd Year's Prize ;
Cheselden Medal.

ATKINSON (F. P.), Kew.

- 1861. 1st Year Matriculation Examination—
Classics and Mathematics, Hon. Cert.

ATKINSON (J.), Kirby-Lonsdale.

- 1853. Chemistry, Hon. Cert.

AVELING (C. T.), Shacklewell.

- 1863. Matriculation Examination—Physics and
Natural History, 1st College Prize ;
1st Year Student, 1st College Prize.
- 1864. 2nd Year Student, 2nd College Prize.
- 1865. 3rd Year Student, 3rd College Prize.

BAILEY (J. H. T.), Greenwich.

- 1843. Materia Medica, Hon. Cert.

BAIN (J.)

- 1855. Midwifery, Hon. Cert.

BARWELL (R.),‡ Norwich.

- 1847. Medicine, Hon. Cert. ;
Midwifery, Hon. Cert.
- 1848. Physical Society's Essay, Treasurer's
Prize ;
Physiology and Anatomy, Hon. Cert. ;
Midwifery, Hon. Cert. ;
Dresser's Surg. Repts., Hon. Cert.
- 1850. Clinical Medicine, Prize.

BATESON (J. M.), Kirby-Lonsdale.

- 1855. Chemistry, Hon. Cert.

BEAL (P.), Plymouth.

- 1844. Chemistry, 2nd Prize.

BEARDSLEY (A.), Shipley, Derby.

- 1843. Midwifery, 2nd Prize.

BEDFORD (R. J.),§ Sleaford.

- 1858. Midwifery, Hon. Cert.

BENWELL (H. D.), Greenwich.

- 1843. Chemistry, 2nd Prize.
- 1845. Physiology and Anatomy, Medal.
- 1847. Clinical Medical Reports, Prize ;
Gen. Proficiency, Treas. Medal.

BELL (C. N.), Rochester.

- 1867. 3rd Year Student, 3rd Coll. Prize.

BELL (J. V.), Rochester.

- 1859. 1st Year Student, Treasurer's 2nd Prize ;
Matriculation Examination—Classics
and Mathematics, Hon. Cert.
- 1860. 2nd Year Student, Hon. Cert.
- 1861. 3rd Year Student, 3rd Coll. Prize.

BIDDLE (D.), Wotton-under-Edge.

- 1860. 1st Year Student, Treas. Prize ;
Matriculation Exam.—Prize.
- 1861. 2nd Year Student, Hon. Cert.
- 1862. 3rd Year Student, Hon. Cert.

BIRTWELL (H. H.), Enfield, Lancashire.

- 1865. 3rd Year Student, Hon. Cert.

BLACK (J.), Kentish Town.

- 1872. 2nd Year Student, Prosecutor's Prize.

* Late Surgical Tutor, Surgeon to Great Northern Hospital, Surgeon to St. Mark's Hospital.

† Assistant Demonstrator of Anatomy at St. Thomas's Hospital ; late Surgical Registrar.

‡ Assistant-Surgeon and Lecturer on Comparative Anatomy at Charing Cross Hospital.

§ Late Assistant-Surgeon at the Dreadnought Hospital Ship.

BLACK (W. S.), Chesterfield, Derby.

1855. Midwifery, Hon. Cert.;
Medicine, Hon. Cert.

BLACKETT (W. C.), Durham.

1851. Descriptive Anatomy, Hon. Cert.

BLADES (C. C.)

1855. Midwifery, Hon. Cert.

BONE (W.), Camberwell.

1857. 1st Year Student, Treas. 1st Prize.
1858. 2nd Year Student, Treas. 1st Prize.

BONSER (J. H.), Sutton-in-Ashfield.

1871. 3rd Year Student, 2nd Coll. Prize;
Cheselden Medal.

BOULGER (J.), Gravesend.

1870. 1st Year Student, Sir Wm. Tite's
Scholarship.
1871. 2nd Year, Sir W. Tite's Scholarship.
w1872. 3rd Year, Sir W. Tite's Scholarship.

BOWEN (E.), Llwyn-Gwair, Pembroke.

1847. Descriptive and Surgical Anatomy, Hon.
Cert.;
Materia Medica, Hon. Cert.
1848. Descriptive and Surgical Anatomy,
Hon. Cert.;
Physiology and Anatomy, Hon. Cert.;
Botany, Hon. Cert.;
Comparative Anatomy, Hon. Cert.

BOWN (J. Y.), America.

1848. Descriptive and Surgical Anatomy,
Hon. Cert.

BRAKE (J.), Holt, Wilts.

1851. Matriculation Scholarship, Hon. Cert.;
Descriptive Anatomy, Hon. Cert.;
1st Year Student, Scholarship;
Chemistry, Hon. Cert.
1852. 2nd Year Student, Scholarship;
Physiology, Prize;
Materia Medica, Hon. Cert.;
Botany, Hon. Cert.;
Medicine, Hon. Cert.
1853. 3rd Year Student, Scholarship;
Clinical Medicine, Treas. Prize;
Midwifery, Prize;
Forensic Medicine, Prize.

BRISTOWE (J. S.),* Camberwell.

1847. Medicine, Hon. Cert.;
Physiology and Anatomy, Hon. Cert.;
Descriptive and Surgical Anatomy,
Prize.
1848. Descriptive and Surgical Anatomy, Hon.
Cert.;
Physiology and Anatomy, Prize;
Practical Chemistry, Prize;
Botany, Prize;
Medicine, Prize;
Midwifery, Hon. Cert.;
Comparative Anatomy, Prize;
Surgery, Prize;
General Proficiency, Treasurer's Medal.

BRITTON (T.), Doncaster.

1861. 1st Year Student, Hon. Cert.

BROCK, (J.), Northwich.

w1872. 1st Year Student, 2nd Coll. Prize.

BROWN (F. G.), London.

1860. 1st Year Student, Hon. Cert.
1861. 2nd Year Student, 3rd Coll. Prize.
1862. 3rd Year Student, 3rd Coll. Prize.

BROWN (G. D.), Croydon.

1851. Physiology, Hon. Cert.;
Botany, Prize;
Surgery, Hon. Cert.
1852. Physiology, Hon. Cert.;
Physical Society's Essay, Treasurer's
Prize;
Medicine, Hon. Cert.;
Pathology, Prize.

BROWN (T. J. E.), Dorchester.

1848. Practical Midwifery, Hon. Cert.

BUCKNILL (E. R.), Bedford.

1855. 1st Year Student, Scholarship;
Midwifery, Hon. Cert.;
Chemistry, Hon. Cert.;
Descriptive Anatomy, Hon. Cert.;
Materia Medica, Hon. Cert.

BULL (J.), Norwood, Surrey.

1848. Midwifery, Hon. Cert.

BUTLER (W.), Stoke Newington.

1845. Materia Medica, Hon. Cert.

CARPENTER (A.), Rothwell.

1848. Descriptive and Surgical Anatomy, Hon.
Cert.;
Chemistry, Prize;
Materia Medica, Hon. Cert.;
Matriculation Scholarship, Prize.
1849. Physiology, Hon. Cert.;
Midwifery, Hon. Cert.;
Descriptive Anatomy, 1st Prize;
Medicine, 2nd Prize.
1850. Physiology, Hon. Cert.;
Descriptive Anatomy, Hon. Cert.;
Botany, Prize;
Medicine, Prize;
Surgery, Prize;
General Proficiency, Treasurer's Medal.
1851. (Accoucheur) Midwifery, Prize;
Essay on Chorea, Mr. N. Smith's Prize.
1852. Surgical Reports, President's Prize;
Medical Reports, Dr. Roots' Prize;
Ophthalmic Reports, a Governor's Prize
Clinical Medicine, Senior Prize.

CARR (J. T.), Bombay.

1844. Surgery, Prize.

CAUDLE (A. W. W.), Henfield, Sussex.

1858. Clinical Medicine, Prize.

CHALDECOTT (C. W.), Dorking.

1849. Descriptive Anatomy, Hon. Cert.;
Chemistry, Hon. Cert.;
Materia Medica, 2nd Prize;
1st Year Student, Scholarship.
1850. Physiology, Hon. Cert.;
Surgery, Prize.
1851. Physiology, Prize;
Descriptive Anatomy, Hon. Cert.;
Medicine, Hon. Cert.;
Physical Society's Essay, Treasurer's
Prize;
Surgery, Hon. Cert.;
General Proficiency, Treasurer's Silver
Medal.

* Physician to and Lecturer on General
Pathology at St. Thomas's Hospital. Late Joint
Lecturer on Physiology.

CHALDECOTT (T. A.), Newington.

1848. Descriptive Surgical Anatomy, Hon. Cert.;

Chemistry, Hon. Cert.;

Botany, Hon. Cert.;

Materia Medica, Hon. Cert.;

Comparative Anatomy, Hon. Cert.;

Matriculation Scholarship, Prize;

Practical Chemistry, Hon. Cert.

1849. Physiology, Hon. Cert.;

Midwifery, Hon. Cert.;

Surgery, 2nd Prize;

Medicine, Hon. Cert.

1850. Physiology, Hon. Cert.;

Forensic Medicine, Prize;

Pathology, Prize;

Medicine, Hon. Cert.;

Surgery, Hon. Cert.

CHAPMAN (C. E.), Preston.

1855. Midwifery, Hon. Cert.;

Materia Medica, Hon. Cert.

1857. Clinical Assistant, Prize;

Physical Society's Essay, Prize.

CHERRY (A. H.), Clapham.

1845. Clinical Medicine, Hon. Cert.

CHIPPERFIELD (W. N.), Reading.

1852. 1st Year Student, Scholarship;

Descriptive Anatomy, Prize.

1853. 2nd Year Student, Scholarship;

Physiology, Prize;

Descriptive Anatomy, Prize;

Midwifery, Prize;

Physical Society's Essay, Prize;

Medicine, Prize;

Surgery, Prize.

1854. 3rd Year Student, Scholarship;

Medicine, Prize;

Descriptive Anatomy, Hon. Cert.;

Midwifery, Prize;

Physical Society's Essay, Treasurer's

Prize;

Forensic Medicine, Prize;

Chemistry, Hon. Cert.;

Comparative Anatomy, Prize;

Pathology, Prize;

Surgery and Surgical Anatomy, Chesel-

den Medal;

Clinical Medicine, Treasurer's Prize;

Physiology, Prize;

General Proficiency, Treasurer's Medal.

CLAPTON (E.),* Stamford.

1851. Matriculation Scholarship, Hon. Cert.;

1st Year Student, 1st Scholarship;

Descriptive Anatomy, Prize;

Chemistry, Prize.

1852. 2nd Year Student, Scholarship;

Physiology, Prize;

Materia Medica, Prize;

Botany, Prize;

Medicine, Hon. Cert.

1853. 3rd Year Student, Scholarship;

Physiology, Hon. Cert.;

Clinical Medicine, Treasurer's Prize;

Midwifery, Hon. Cert.;

Physical Society's Essay, Treasurer's

Prize;

Medicine, Hon. Cert.;

Forensic Medicine, Hon. Cert.;

Chemistry, Hon. Cert.;

Surgery, Hon. Cert.

1854. Ophthalmic Reports, Governor's Prize;

Clinical Medicine, Mr. N. Smith's Prize.

CLAPTON (W.), Stamford.

1855. Midwifery, Hon. Cert.;

Descriptive Anatomy, Hon. Cert.;

Materia Medica, Prize.

1856. Clinical Medicine, Prize.

1858. Midwifery, Hon. Cert.

CLARKE (A.), Dorking.

1856. 1st Year Student, Treasurer's 2nd Prize.

CLARK (J. H.), Jamaica.

1867. 2nd Year Student, Physical Society's

2nd Year's Prize.

CLARKSON (J. W.), Surbiton.

w1872. 2nd Year Student, 3rd Coll. Prize.

CLEGHORN (G.), Bedford.

1872. 3rd Year Student, Hon. Cert.

COGGINS (T.), Hayford, Woodstock.

1847. Chemistry, Hon. Cert.

1848. Descriptive and Surgical Anatomy, Hon.

Cert.;

Midwifery, Hon. Cert.

1849. Midwifery, Hon. Cert.;

Medicine, Hon. Cert.

1850. Surgical Reports, Prize;

(Accoucheur) Midwifery, Hon. Cert.

COLBY (W. T.), Malton, York.

1849. Descriptive Anatomy, Hon. Cert.;

Midwifery, Hon. Cert.

COLLIER (T. P.), Worship Square.

1847. Practical Midwifery, Prize.

COMPLIN (E. J.), Charterhouse Square.

1851. Clinical Medicine, Prize;

Medical Cases, President's Prize;

Surgery, Hon. Cert.

1852. Midwifery, Hon. Cert.;

Pathology, Hon. Cert.

COOK (W.), Gainsboro'.

1844. Chemistry, Hon. Cert.;

Materia Medica, Hon. Cert.

COOK (J.), Stamford.

1855. Comparative Anatomy, Prize;

Midwifery, Hon. Cert.;

Physiology, Hon. Cert.

CORY (R.), Carlisle.

1870. Physical Society's 3rd Year's Prize.

COUSINS (J. W.), Portsea.

1854. Descriptive Anatomy, Hon. Cert.

Chemistry, Hon. Cert.

1855. Surgery, Prize;

Midwifery, Prize;

Midwifery, Hon. Cert.

1856. Clinical Medicine, Prize;

Surgery and Surgical Anatomy, Chesel-

den Medal.

COWEN (P.), Kennington.

1862. 1st Year Student, 2nd Coll. Prize.

1863. 2nd Year Student, 2nd Coll. Prize.

1864. 3rd Year Student, 2nd Coll. Prize.

COX (E.), Maiden Newton, Dorsetshire.

1866. 1st Year Student, 3rd Coll. Prize.

1868. 3rd Year Student, 2nd Coll. Prize.

CROFT (J.),† Clapton.

1851. Descriptive Anatomy, Hon. Cert.

1853. Midwifery, Hon. Cert.

* Physician to, and Lecturer on Materia Medica at, St. Thomas's Hospital. Physician to the Magdalen Hospital.

† Surgeon to, and Joint Lecturer on Practical and Manipulative Surgery at, St Thomas's Hospital; late Assistant Demonstrator of Anatomy, Surgeon to the Magdalen Hospital.

- CROFTS (W. C.),** Rowston, Lincoln.
1855. Surgery, Hon. Cert.;
Midwifery, Hon. Cert.
- CROSBY (T. B.),** Gosberton, Lincoln.
1851. Physiology, Prize;
Descriptive Anatomy, Prize;
Medicine, Prize;
Surgery, Prize.
1852. Physiology, Prize;
Descriptive Anatomy, Hon. Cert.;
Medicine, Hon. Cert.;
Forensic Medicine, Prize;
Practical Chemistry, Prize;
Surgery, Hon. Cert.;
Surgery and Surgical Anatomy, *Bronze*
Cheselden Medal;
Comparative Anatomy, Prize.
- CROSSMAN (J.),** Redruth.
1871. Physical Society's 1st Year's Prize.
- DAVIES (D.),** Carmarthenshire.
1843. Chemistry, 1st Prize;
Midwifery, Hon. Cert.;
Materia Medica, Prize.
1844. Medicine, Hon. Cert.;
Physiology and Anatomy, Hon. Cert.
1845. Clinical Surgical Reports, Medal.
- DAY (W. H.),** Norwich.
1844. Physiology and Anatomy, Silver Medal.
1845. Surgery, Prize;
Physical Society's Essay, Hon. Cert.;
Dresser's Clinical Surgery, Prize.
- DECK (J. F.),** Nelson, New Zealand.
1860. 1st Year Student, 1st Coll. Prize.
1861. 2nd Year Student, 1st Coll. Prize;
Physical Society's Prize.
1862. 3rd Year Student, 1st Coll. Prize;
Physical Society's Prize;
Cheselden Medal;
Treasurer's Gold Medal.
- DICKERSON (S. H.),** Hartest, Suffolk.
1853. Physiology, Hon. Cert.;
Materia Medica, Hon. Cert.;
Midwifery, Hon. Cert.;
Medicine, Hon. Cert.
- DIXON (E. L.),** Preston, Lancashire.
1852. 1st Year Student, Scholarship;
Chemistry, Hon. Cert.
1853. 2nd Year Student, Scholarship;
Physiology, Hon. Cert.;
Materia Medica, Prize;
Descriptive Anatomy, Hon. Cert.;
Midwifery, Hon. Cert.;
Botany, Prize;
Medicine, Hon. Cert.
1854. 3rd Year Student, Scholarship;
Descriptive Anatomy, Hon. Cert.;
Practical Chemistry, Prize;
Physiology, Hon. Cert.
- DOBSON (N. C.),*** Holbeach, Lincolnshire.
1865. 1st Year Student, 1st Coll. Prize.
1866. 2nd Year Student, 1st Coll. Prize.
1867. 3rd Year Student, 2nd College Prize;
A Prize and Hon. Cert. for Proficiency
in Surgery and Surgical Anatomy at
the Cheselden Medal Examination;
Treasurer's Gold Medal.
- DRAKE (A. J.),** Kingsclere, Hants.
1870. 3rd Year Student, 1st College Prize.
- DRAKE (C. H.),** Kingsclere, Hants.
1857. 1st Year Student, Hon. Cert.
1858. 2nd Year Student, Treasurer's 1st
Prize;
Clinical Medicine, 2nd Prize.
1859. 3rd Year Student, Hon. Cert.;
Surgery and Surgical Anatomy, Chesel-
den Medal;
General Proficiency, Treasurer's Medal.
- DRAKE (T.),** Kingsclere, Hants.
1858. 1st Year Student, Treasurer's 1st Prize.
1859. 2nd Year Student, President's Prize.
1860. 3rd Year, 1st College Prize;
Surgery and Surgical Anatomy, Chesel-
den Medal;
General Proficiency, Treasurer's Medal.
- DREW (G. F. A.),** Plymouth.
1848. Descriptive and Surgical Anatomy,
Prize.
Chemistry Hon. Cert.;
Botany, Prize;
Comparative Anatomy, Hon. Cert.;
Practical Chemistry, Prize;
General Proficiency, Hon. Cert.
1849. Physiology, 2nd Prize;
Midwifery, Hon. Cert.;
Descriptive Anatomy, Hon. Cert.;
Medicine, Hon. Cert.
1850. Physiology, Prize;
Descriptive Anatomy, Hon. Cert.;
Medicine, Hon. Cert.;
Surgery, Hon. Cert.
- DUKES (C.),** Dalston.
1865. 1st Year Student, Hon. Cert.
1867. 3rd Year Student, Hon. Cert.;
Prosecutor's Prize and Hon. Cert.
- DUNMAN (G.),** Camberwell.
1852. Chemistry, Hon. Cert.
1854. Midwifery, Hon. Cert.
- DYER (F. J.),** Blackheath.
1847. Chemistry, Prize;
Materia Medica, Hon. Cert.
1849. Physiology, Hon. Cert.;
Midwifery, 2nd Prize;
Medicine, Hon. Cert.
- EDDOWES (J. H.),** Loughboro'.
1843. Physiology and Anatomy, Hon. Cert.
Chemistry, Hon. Cert.;
Comparative Anatomy, Prize.
1844. Physiology and Anatomy, Hon. Cert.;
Clinical Medical Reports, Silver Medal.
1845. Clinical Medicine, Prize.
- EDDOWES (W. D.),** Loughboro'.
1845. Descriptive and Surgical Anatomy,
Prize.
- EDMONDS (S.),** St. Helen's, Lancashire.
1852. Chemistry, Hon. Cert.
1853. Midwifery, Hon. Cert.;
Medicine, Hon. Cert.;
Surgery, Hon. Cert.
1854. Surgery and Surgical Anatomy, Hon.
Cert.;
Clinical Medicine, Treas. Prize;
Clinical Medicine, Pres. Prize.
1855. Surgical Reports, Pres. Prize;
Clinical Medicine, Dr. Roots' Prize.
- EDWARDS (S.),** Littlehampton.
1855. Midwifery, Hon. Cert.

* Surgeon to the Bristol General Hospital,
and Lecturer on Anatomy at the Bristol Medical
School.

EDWARDS (V.), Woodbridge, Suffolk.
1843. Surgery, Prize.

ELDBOROUGH (P. J.), Herne Bay.

1845. Chemistry, Hon. Cert.

1847. Medicine, Hon. Cert.;
Midwifery, Prize.

1848. Medicine, Hon. Cert.;
Surgery, Hon. Cert.;
Surgical Reports, Pres. Prize.

ELLIS (J.), Portsea, Hants.

1857. Clinical Assistant (Medicine), Hon.
Cert.

ELWIN (C. J.), London.

1855. Practical Midwifery, Prize.

FAIRBANK (J.), Islington.

1865. 1st Year Student, Hon. Cert.

1866. 2nd Year Student, Prosector's Prize.

FARRANT (S.), Collumpton, Devon.

1859. 2nd Year Student, Hon. Cert.

1860. 3rd Year Student, Hon. Cert.

FAULKNER (R.), Camberwell.

1844. Botany, Prize;
Clinical Medical Reports, Hon. Cert.

FERNIE (A.), Yeldon, Beds.

1853. Physiology, Hon. Cert.;
Surgery, Hon. Cert.

FERNIE (W. T.), Yeldon, Beds.

1852. Practical Midwifery Prize;
Midwifery, Hon. Cert.

FOWLER (J. T.), Winterton, Lincoln.

1854. Chemistry, Hon. Cert.

1855. Botany, Hon. Cert.

FOWLER (J.), Winterton, Lincoln.

1859. 1st Year Student, Hon. Cert.

1860. 2nd Year Student, 2nd College Prize.

1861. 3rd Year Student, 2nd College Prize.

FREEMAN (A. J.), Southsea, Hants.

1863. 3rd Year Student, Hon. Cert.

FREEMAN (D.), Kennington.

1859. Clinical Medicine, Prize.

FULTON (J. A.), Stockwell.

1852. Botany, Hon. Cert.

1853. Practical Chemistry, Prize.

GARDNER (E. B.), London.

1858. Matriculation Examination — Classics
and Mathematics, Prize.

GARTON (W.), St. Helier's.

1870. 2nd Year Student, 2nd College Prize;

Physical Society's 2nd Year's Prize;

1871. Physical Society's 3rd Year's Prize.

GIMBLETT (J.), Taunton.

1860. 1st Year Student, Hon. Cert.

GEORGE (C. F.), Kirton-on-Lindsay.

1855. Midwifery, Hon. Cert.

1856. 2nd Year Student, Dr. Roofs' Prize.

1857. 3rd Year Student, Hon. Cert.;
Surgery and Surgical Anatomy,
Cheselden Medal.

GERVIS (F. H.), Tiverton.

1861. 1st Year Matriculation Scholarship,
College Prize, 2nd College Prize.

1862. 2nd Year Student, 1st College Prize.

1863. 3rd Year Student, Hon. Cert. and
Physical Society's Prize.

GERVIS (H.),* Tiverton.

1856. 1st Year Student, Treas. 1st Prize;
Matriculation Examination, Physics,
&c., Prize.

1857. 2nd Year Student, Pres. Prize;

Physical Society's Essay, Prize.

1858. Clinical Assistant (Medicine), 2nd Prize;
Physical Society's Essay, Prize;
General Proficiency, Treasurer's Medal.

GODDARD (E.), London.

1860. Matriculation Examination, Classics,
&c., Prize.

GODDARD (L.), London.

1856. Matriculation Examination, Classics,
and Mathematics, Prize.

GOWLAND (W.), London.

1845. Botany, Hon. Cert.

GRABHAM (C.), Islington.

1857. Matriculation Examination, Modern
Languages, Prize.

GRABHAM (G. W.),† Islington.

1855. Matriculation Examination, Scholar-
ship;

Midwifery, Hon. Cert.;

Materia Medica, Hon. Cert.

GRABHAM (J.), Rochford, Essex.

1848. Descriptive and Surgical Anatomy,
Hon. Cert.

Chemistry, Hon. Cert.

Botany, Hon. Cert.

Comparative Anatomy, Prize.

1850. Physiology, Hon. Cert.

1851. Physiology, Hon. Cert.;

Descriptive Anatomy, Hon. Cert.;

Forensic Medicine, Prize;

Surgery, Prize;

Midwifery, Hon. Cert.

GRABHAM (M. C.), Islington.

1860. 2nd Year Student, Hon. Cert.

1861. 3rd Year Student, Hon. Cert.

GREAVES (C. A.), Derby.

1861. 1st Year Student, Treasurer's Prize;

Matriculation Examination, Hon. Cert.

1862. 2nd Year Student, 2nd College Prize;

Physical Society's Prize.

1863. 3rd Year Student, 1st College Prize,

Physical Society's Prize, Cheselden
Medal.

GREEN (J. T.), Peckham, Surrey.

1865. 1st Year Student, Physical Society's
Prize.

GROSE (S.), Boston, Lincoln.

1858. 2nd Year Student, Hon. Cert.

1859. Physical Society's Essay, Prize.

GRIFFITHS (A. L.), London.

1859. Midwifery, Hon. Cert.

GURNEY (R. A. F.), Rampton, Camb.

1851. Practical Midwifery, Prize.

HAGUE (S.),‡ Camberwell.

1863. 1st Year Student, 2nd Coll. Prize.

* Assistant Obstetric Physician to, and joint
Lecturer on Forensic Medicine at, St. Thomas's
Hospital. Physician to the Deaf and Dumb
Asylum.

† Resident Medical Superintendent at Earls-
wood Asylum.

‡ Late Medical Registrar at St. Thomas's
Hospital.

- HAMERTON (E.)**, Elland, York.
1857. 1st Year Student, Hon. Cert.
- HAMMOND (J. H.)**, Bridlington, York.
1850. Medical Cases, President's Prize.
- HARDING (J. A.)**, Bath.
1859. Clinical Medicine, 2nd Prize.
1860. Clinical Assistant (Medicine), 1st Prize.
- HARPER (R.)**, Brighton.
1844. Clinical Surgical Reports, Hon. Cert.
1845. Physical Society's Essay, Prize;
Dresser's Clinical Surgery, Prize.
- HEWLETT (T. G.)**, Harrow.
1850. Matriculation Scholarship, Prize.
- HEYGATE (W. N.)**, Harslope, Bucks.
1863. 2nd Year Student, Hon. Cert.
1864. 3rd Year Student, Hon. Cert.
- HICKS (J. W.)**,* Highgate New Town, N.
1859. 1st Year Student, Treasurer's 1st Prize.
1860. 2nd Year Student, 1st College Prize;
Physical Society's Prize.
1861. 3rd Year Student, 1st College Prize;
Physical Society's Prize;
Cheselden Medal;
Treasurer's Gold Medal.
- HIGGINS (A. H.)**, Bermondsey.
1857. Midwifery, Hon. Cert.
- HILDITCH (J.)**, Sandbach, Cheshire.
1857. 1st Year Student, Hon. Cert.
1858. Physical Society's Essay, Prize.
1859. Essay on Neuralgia, Mr. N. Smith's Prize.
- HODGES (H. B.)**
1855. Midwifery, Hon. Cert.
- HODGES (R.)**, London.
1843. Physiology and Anatomy, Hon. Cert.;
Medicine, Hon. Cert.;
Clinical Medicine, Hon. Cert.;
Surgical Essay, Silver Medal.
- HOPTON (A. W.)**, Stockwell.
1851. Descriptive Anatomy, Hon. Cert.
- HOOPER (J. H.)**, Upton Warren.
1858. 1st Year Student, Hon. Cert.
1859. 2nd Year Student, College Prize.
1860. 3rd Year Student, Hon. Cert.
- HOWELL (T.)**, London.
1850. Practical Midwifery, Prize.
- HUBBARD (J. W.)**, Leicester.
1847. Clinical Medical Reports, Prize;
Medicine, Prize;
Physiology and Anatomy, Hon. Cert.;
Physical Society's Essay, Treasurer's Prize.
- HUNTER (W. F.)**, Margate.
1859. 1st Year Student, Hon. Cert.;
Matriculation Examination in Classics
and Mathematics, Prize;
Matriculation Examination in Modern
Languages, Prize.
1860. 2nd Year Student, 3rd Coll. Prize.
1861. 3rd Year Student, Hon. Cert.
- HURMAN (H. B.)**, Bridgewater.
1853. Midwifery, Hon. Cert.
- ILES (D.)**, Fairford.
1863. 2nd Year Student, Hon. Cert.
1864. 3rd Year Student, Hon. Cert.
- INGLIS (W. W.)**,† Brixton Hill.
1864. 1st Year Student, 2nd College Prize.
1865. 2nd Year Student, 2nd College Prize.
1866. 3rd Year Student, 3rd College Prize;
Cheselden Medal.
- IVES (R.)**
1853. Midwifery, Hon. Cert.
- JACKSON (T. C.)**, Rotherhithe.
1844. Materia Medica, Hon. Cert.
- JACOBSON (T. E.)**, Sleaford, Lincoln.
1852. Practical Midwifery, Prize.
- JARDINE (J. L.)**, Brixton.
1848. Physiology and Anatomy, Hon. Cert.
1850. Medical Reports, Dr. Roots' Prize.
- JEFFERSON (T. J.)**, Hull.
1861. 2nd Year Student, Hon. Cert.
1862. 3rd Year Student, Hon. Cert.
- JOHNSON (W. G.)**, Wandsworth.
1853. Chemistry, Hon. Cert.
1854. Midwifery, Hon. Cert.
1855. Comparative Anatomy, Prize;
Midwifery, Hon. Cert.
- JONES (S.)**,‡ Cricklewood, Middlesex.
1851. Matriculation Scholarship, Prize;
Descriptive Anatomy, Hon. Cert.;
Chemistry, Hon. Cert.;
1st Year Student, Scholarship.
1852. 2nd Year Student, Scholarship;
Physiology, Hon. Cert.;
Descriptive Anatomy, Prize;
Botany, Hon. Cert.
1853. Physiology, Hon. Cert.;
Descriptive Anatomy, Hon. Cert.;
3rd Year Student, Scholarship.
- JONES (T.)**
1855. Midwifery, Hon. Cert.
- JONES (T. M.)**, Swansea.
Surgery, Hon. Cert.;
Midwifery, Hon. Cert.
- JONES (A. O.)**, Islington.
1862. 1st Year Student, Hon. Cert.
- JONES (J.)**, Ilfracombe.
1863. Matriculation Examination—Modern
Languages and Modern History,
College Prize.
- KEELE (G. T.)**, South Lambeth.
1853. Materia Medica, Hon. Cert.;
Midwifery, Hon. Cert.
- KERAKOOSE (J.)**, East Indies.
1854. Midwifery, Hon. Cert.

† Late Medical Registrar at St. Thomas's Hospital.

‡ Surgeon to, and Joint-Lecturer on Surgery at, St. Thomas's Hospital; late Lecturer on Anatomy and Ophthalmic Surgery.

* Late lecturer on Botany at St. Thomas's Hospital; and Curator of the Museum.

KEYWORTH (J. W.),* Aston, Berks.

1848. Chemistry, Hon. Cert.;
Materia Medica, Prize;
General Proficiency, Hon. Cert.
1849. Physiology, Hon. Cert.;
Midwifery, 3rd Prize;
Medicine, Hon. Cert.;
Physical Society's Essay, Prize.
1850. Physiology, Hon. Cert.;
Accoucheur (Midwifery), Hon. Cert.;
Ophthalmic Reports, a Governor's
Prize;
Essay on Neuralgia, Mr. Newman
Smith's Prize.
1851. Comparative Anatomy, Prize;
Clinical Medicine, Prize;
Surgical Reports, Prize;
Midwifery, Prize;
Medical Reports, Prize;
Pathology, Prize;
Physical Society's Essay, Prize.

LANKESTER (H.), Poole, Dorset.

1850. 1st Year Student, Scholarship;
Descriptive Anatomy, 1st Prize;
Chemistry, Prize.
1851. Physiology, Prize;
Materia Medica, Prize;
Descriptive Anatomy, Hon. Cert.;
Botany, Hon. Cert.;
Medicine, Prize;
Physical Society's Essay, Prize;
Surgery, Hon. Cert.
1852. 3rd Year Student, Scholarship;
Physiology, Hon. Cert.;
Descriptive Anatomy, Hon. Cert.;
Medical Cases, President's Prize;
Medicine, Prize;
Surgery, Prize;
Surgery and Surgical Anatomy, Chesel-
den Medal;
General Proficiency, Treasurer's Medal.
1853. Surgical Essay, President's Prize.

LAVER (H.)

1855. Midwifery, Hon. Cert.;
Materia Medica, Hon. Cert.

LAVER (A. H.), Rayleigh.

1870. 1st Year Student, 3rd College Prize.
1871. 2nd Year Student, 2nd College Prize.
1872. 3rd Year Student, 2nd College Prize;
Cheselden Medal.

LEDGER (M.), London.

1854. Dresser's Clinical Surgery, Prize.

LEES (J.),† Wolverhampton.

1859. 1st Year Student, Hon. Cert.;
3rd Year Student, Hon. Cert.;
Physical Society's Prize.

LEESON (T.), Snaith, York.

1847. Medicine, Hon. Cert.;
Surgery, Prize;
Physiology and Anatomy, Hon. Cert.;
Descriptive and Surgical Anatomy, Hon.
Cert.;
Midwifery, Hon. Cert.
1848. Descriptive and Surgical Anatomy, Hon.
Cert.;
Physiology and Anatomy, Hon. Cert.;
Medicine, Hon. Cert.;
Midwifery, Prize.

LE GROS (J.), Jersey.

1841. Medicine, Hon. Cert.;
Midwifery, 1st Prize.
1845. Clinical Medical Reports, Medal;
Medicine, Hon. Cert.;
Dresser's Clinical Surgery, Prize.

**LITTLEJOHN (S. G.), Falmouth,
Jamaica.**

1865. 1st Year Student, Hon. Cert.

LOCOCK (H. S.), Blackheath.

1848. Descriptive and Surgical Anatomy, Hon.
Cert.;
Physiology and Anatomy, Hon. Cert.;
Midwifery, Hon. Cert.
1849. Physiology, Hon. Cert.

LUSH (W. H.), Devizes.

1872. 2nd Year Student, Prosecutor's Prize.

MACMURDO (H. H.), New Broad Street.

1847. Chemistry, Hon. Cert.
1849. Midwifery, Hon. Cert.

MANBY (W. G.), Barking, Essex.

1851. Descriptive Anatomy, Hon. Cert.

MARCH (H. C.), Newbury.

1858. 1st Year Student, Treasurer's 2nd Prize.
1859. 2nd Year Student, Hon. Cert.
1860. 3rd Year Student, Hon. Cert.

MASON (M. T.), Newington.

1845. Practical Midwifery, Hon. Cert.

MAYBURY (A. C.), Frimley, Surrey.

1865. 3rd Year Student, Hon. Cert.

MAYBURY (W. A.), Frimley, Surrey.

1867. 1st Year Student, 3rd College Prize.

MAYBURY (H. M.), Frimley, Surrey.

1869. 1st Year Student, 2nd College Prize.
1871. 3rd Year Student, 3rd College Prize.

MAYBURY (A. V.), Frimley.

1870. 1st Year Student, 2nd College Prize.
1871. 2nd Year Student, 1st College Prize.
1872. 3rd Year Student, 1st College Prize;
Treasurer's Gold Medal.

MAYNARD (J. C. M.)

1855. Midwifery, Hon. Cert.

MEADOWS (H.), Leicester.

1867. 1st Year Student, the William Tite
Scholarship;
Physical Society's 1st Year's Prize.
1868. 2nd Year, Tite Scholarship;
Physical Society's 2nd Year's Prize.

MILLER (B.), London.

1845. Midwifery, Hon. Cert.;
Practical Midwifery, Prize;
Clinical Medicine, Prize.

MILNE (C. W.), Aberdeen.

1865. 1st Year Student, Hon. Cert.

MITCHELL (J.), Leicester.

1866. 1st Year Student, 2nd College Prize;
Physical Society's 1st Year's Prize.
1867. 2nd Year Student, 2nd College Prize.
1868. 3rd Year Student, 2nd College Prize.

* Lecturer on Physiology at Sydenham Col-
lege, Birmingham.

† Late Demonstrator of Morbid Anatomy at
St. Thomas's Hospital

- MONEY (F. J.), Offham, Kent.**
 1849. Descriptive Anatomy, 2nd Prize;
 Chemistry, Prize;
 Materia Medica, 1st Prize;
 Matriculation, Scholarship, Prize
 1st Year Student, Scholarship.
- 1850.** Physiology, Prize;
 Comparative Anatomy, Prize;
 Descriptive Anatomy, Prize;
 Medicine, Prize;
 Surgery, Hon. Cert.
- 1851.** Descriptive Anatomy, Hon. Cert.;
 Midwifery, Prize;
 Medicine, Prize;
 Physical Society's Essay, Prize;
 Surgery, Prize;
 Surgery and Surgical Anatomy, Chesel-
 den Medal;
 General Proficiency, Treasurer's Gold
 Medal.
- MORETON (J. E.), Marton, Cheshire.**
 1850. 1st Year Student, Scholarship;
 Descriptive Anatomy, Hon. Cert.;
 Chemistry, Hon. Cert.
- 1851.** Materia Medica, Hon. Cert.;
 Botany, Hon. Cert.
- 1852.** Physiology, Prize;
 Descriptive Anatomy, Prize;
 Physical Society's Essay, Prize;
 Medicine, Prize;
 Surgery, Prize;
 2nd Year Student, Scholarship.
- 1853.** 3rd Year Student, Scholarship;
 Physiology, Prize;
 Clinical Medicine, President's Prize;
 Clinical Medicine, Treasurer's Prize;
 Clinical Medicine, Mr. N. Smith's Prize;
 Descriptive Anatomy, Hon. Cert.;
 Midwifery, Hon. Cert.;
 Ophthalmic Surgery, Prize;
 Medicine, Prize;
 Forensic Medicine, Hon. Cert.;
 Surgery, Hon. Cert.;
 Surgery and Surgical Anatomy, Chesel-
 den Medal;
 General Proficiency, Treasurer's Medal.
- 1854.** Clinical Medicine, Dr. Roots' Prize.
 Pathology, Hon. Cert.
- MORETON (T.), Marton, Cheshire.**
 1857. 1st Year Student, Treasurer's 2nd Prize;
 Matriculation Examination, Classics and
 Mathematics, Prize.
- 1858.** Clinical Medicine, Prize.
- 1859.** 3rd Year Student, Hon. Cert.;
 Clinical Medicine, 2nd Prize.
- MORGAN (S.), London.**
 1852. Descriptive Anatomy, Hon. Cert.
- 1853.** Midwifery, Hon. Cert.
- 1854.** Midwifery, Hon. Cert.;
 Forensic Medicine, Hon. Cert.
- MORTON (J.), Holbeach, Lincoln.**
 1861. 1st Year Student, Hon. Cert.
- 1862.** 2nd Year Student, Hon. Cert.
- 1863.** 3rd Year Student, Hon. Cert.
- MOXON (H. M.), Brigsham.**
 1871. Prosector's Prize.
- MUSSON (W. E.), Birkholme, Lincoln.**
 1850. Matriculation, Scholarship, Prize;
 Descriptive Anatomy, Hon. Cert.;
- 1851.** Physiology, Hon. Cert.;
 Comparative Anatomy, Hon. Cert.;
 Medicine, Hon. Cert.
- NEWBY (C. H.), London.**
 1870. Prosector's Prize.
- NEWTN (A. H.), Kennington, Surrey.**
 1865. 1st Year Student, Hon. Cert.
- NICHOL (R.), Camberwell.**
 1844. Chemistry, 1st Prize;
 Materia Medica, Prize.
- 1845.** Physiology and Anatomy, Hon. Cert.;
 Botany, Prize;
 Comparative Anatomy, Prize.
- O'CALLAGHAN (C.), Killarney.**
 1847. Chemistry, Hon. Cert.;
 Materia Medica, Prize.
- 1848.** Medical Reports, President's Prize;
 Physiology and Anatomy, Hon. Cert.;
 Midwifery, Hon. Cert.;
 Practical Midwifery, Prize;
 Forensic Medicine, Prize;
 Physical Society's Essay, Prize.
- 1849.** Physical Society's Essay, Treas. Prize;
 Resident Accoucheur's Report, Prize.
- ORANGE (W.), * Torquay.**
 1854. Midwifery, Hon. Cert.
- 1856.** Midwifery, Hon. Cert.
- ORD (G. R.), Brixton.**
 1858. Midwifery, Hon. Cert.
- ORD (W. M.), † Brixton.**
 1853. Matriculation Examination, Scholarship;
 1st Year Student, Scholarship;
 Descriptive Anatomy, Prize;
 Chemistry, Prize.
- 1854.** 2nd Year Student, Scholarship;
 Medicine, Prize;
 Materia Medica, Prize;
 Descriptive Anatomy, Hon. Cert.;
 Midwifery, Hon. Cert.;
 Surgery, Hon. Cert.;
 Physiology, Prize.
- 1855.** 3rd Year Student, Scholarship;
 Surgery and Surgical Anatomy, Chesel-
 den Medal;
 Forensic Medicine, Prize;
 Pathology, Prize;
 Practical Chemistry, Prize;
 Medicine, Hon. Cert.;
 Descriptive Anatomy, Hon. Cert.;
 Physiology, Prize;
 General Proficiency, Treasurer's Medal.
- 1856.** Registrar, Prize.
- OSBORN (S.), Brixton.**
 1870. Physical Society's 2nd Year's Prize.
- UGHTON (T.), London.**
 1858. Clinical Medical Assistant, 1st Prize.
- OZANNE (C. H.), Guernsey.**
 1844. Descriptive and, Surgical Anatomy,
 Prize.
- OZANNE (J.), Guernsey.**
 1843. Physiology and Anatomy, Cheselden
 Medal;
 Comparative Anatomy, Hon. Cert.
- 1844.** Medicine, Prize;
 Midwifery, 2nd Prize;
 Surgery, Hon. Cert.;
 Physical Society's Essay, Prize;
 Clinical Surgical Reports, Silver Medal.

* Resident Medical Superintendent at Broad-
 moor Asylum.

† Assistant-Physician to, and Joint Lecturer
 on Physiology and Practical Anatomy at, St
 Thomas's Hospital; late Lecturer on Compar-
 ative Anatomy.

PALMER (M. H. C.), Newbury, Berks.
1871. Physical Society's 2nd Year's Prize.

PEARCE (G.), Salisbury.
1860. 1st Year Student, 2nd College Prize.
1861. 2nd Year Student, 2nd College Prize.

PENBERTHY (J.), Redruth.
1854. 1st Year Student, Scholarship;
Descriptive Anatomy, Prize;
Chemistry, Hon. Cert.
1855. 2nd Year Student, Scholarship;
Midwifery, Hon. Cert.;
Botany, Prize;
Descriptive Anatomy, Hon. Cert.

PERN (A.), Winchester, Hampshire.
1865. 1st Year Student, Hon. Cert.

PHILLIPS (G. G.), Newcastle Emlyn.
1859. 2nd Year Student, Hon. Cert.
1860. 3rd Year Student, 3rd College Prize.

PICKFORD (J. K.), Brixton.
w1872. 1st Year Student, 3rd College Prize.

PIKE (W. R.), Leicester.
1868. Physical Society's 1st Year's Prize.

PIKE (J. B.), Leicester.
w1872. 2nd Year Student, Hon. Cert.

PLOWMAN (R.), Bridgewater, Somerset.
1862. 1st Year Student, Hon. Cert.
1863. 2nd Year Student, Hon. Cert.
1865. 3rd Year Student, Hon. Cert.

POLLARD (F.), Taunton, Somerset.
1865. 1st Year Student, 2nd College Prize.
1866. 2nd Year Student, 2nd College Prize;
Physical Society's 2nd Year's Prize.
1868. 3rd Year Student, 1st College Prize;
Physical Society's 3rd Year's Prize;
Cheselden Medal.

POTTER (H. P.), Denmark Hill.
w1872. 1st Year Student, Hon. Cert.

PURVIS (J. P.), Blackheath.
1861. 1st Year Student, Hon. Cert.;
Matriculation Examination, Hon. Cert.
1862. 2nd Year Student, Hon. Cert.
1863. 3rd Year Student, Hon. Cert.

RAINBOW (F.), Lower Norwood.
1864. 1st Year Student, Hon. Cert.
1865. 2nd Year Student, 3rd College Prize.
1866. 3rd Year Student, 2nd College Prize.

RAYNER (H.),* Hythe, Kent.
1862. Matriculation Examination — Physics
and Natural History, Hon. Cert.;
1st Year Student, 1st College Prize.
1863. 2nd Year Student, 1st College Prize.
1864. 3rd Year Student, Hon. Cert.;
Hon. Cert. for the Cheselden Medal.

RICHARDSON (C. S.), Greenwich.
1851. Surgery, Hon. Cert.
1852. Midwifery, Prize.

RICHARDSON (L.), Greenwich.
1848. General Pathology, Prize.

RIDGE (J. J.), Horslydown.
1864. 1st Year Student, the William Tite
Scholarship.
1865. 2nd Year of Tite's Scholarship;
Physical Society's 2nd Year's Prize;
Prosecutor's Prize.
1866. The Granger Testimonial Prize.
1868. 3rd Year Tite Scholarship;
Hon. Cert. for proficiency in Surgery
and Surgical Anatomy;
Treasurer's Gold Medal.

ROGERS (R. S.), Greenwich.
1848. Midwifery, 1st Prize;
Clinical Medicine, Hon. Cert.

ROSSITER (G. F.), Taunton.
1871. 1st Year Student, 1st College Prize;
w1872. 2nd Year Student, 2nd College Prize.

RUDALL (J. T.), Crediton, Devon.
1833. Physiology, Hon. Cert.;
Midwifery, Hon. Cert.;
Medicine, Hon. Cert.;
Surgery, Hon. Cert.

SANDFORD (H. C.), Brixton.
w1872. 1st Year Student, 1st College Prize.

SANKEY (G. G.), Ashford, Kent.
1864. 3rd Year Student, 3rd College Prize.

SAUNDERS (G. M. C.), London.
1843. Midwifery, Hon. Cert.

SAUNDERS (H. W.), London.
1867. 1st Year Student, 2nd College Prize.
1868. Prosecutor's Prize.
1869. 3rd Year Student, 1st College Prize;
Treasurer's Gold Medal;
Physical Society's 3rd Year's Prize.

SAUNDERS (W. S.), Camden Town.
1844. Midwifery, Hon. Cert.
1845. Medicine, Prize;
Midwifery, Prize;
Clinical Medicine, Prize.

SCOTT (R. J.), Omagh, Tyrone.
1861. 1st Year Student, Hon. Cert.

SEWELL (E.), Little Oakley.
1848. Physiology and Anatomy, Hon. Cert.

SEDGWICK (J.), Boroughbridge.
1851. Descriptive Anatomy, Hon. Cert.
1855. Surgery, Hon. Cert.;
Midwifery, Hon. Cert.

SEDGWICK (L. W.), Boroughbridge.
1845. Descriptive and Surgical Anatomy, Prize;
Physiology and Anatomy, Prize;
Medicine, Hon. Cert.;
Midwifery, Prize;
Surgery, Prize.
1849. Physiology, 1st Prize;
Midwifery, 1st Prize;
Surgery, 1st Prize;
Medicine, 1st Prize;
General Proficiency, Treasurer's Medal.

SERGEANT (E.), Preston.
1870. 3rd Year Student, 3rd College Prize;
Cheselden Medal.

SHEA (H. G.), London.
1860. 1st Year Student, Hon. Cert.
1861. 2nd Year Student, Hon. Cert.
1862. 3rd Year Student, 2nd College Prize.

* Medical Superintendent, Hanwell Asylum,
and Lecturer on Psychology at Middlesex
Hospital.

SHEA (J.), London.

1855. Midwifery, Hon. Cert.
1859. Midwifery, Hon. Cert.

SIDDALL (J. B.), Morton, Derby.

1862. 1st Year Student, Hon. Cert.
1863. 2nd Year Student, Hon. Cert.
1864. 3rd Year Student, Hon. Cert.;
Hon. Cert. for the Cheselden Medal.

SIMON (M. F.), Blackheath.

1866. 1st Year Student, 1st College Prize.
1869. 3rd Year Student, 3rd College Prize;
Prosecutor's Prize;
Prize and Hon. Cert. for Surgery and
Surgical Anatomy.

SIMMONDS (H. B. M.), West Indies.

1849. Descriptive Anatomy, Hon. Cert.

SISSONS (W. H.), Hull.

1858. Matriculation Examination — Physics,
&c., Prize.
1859. 2nd Year Student, Hon. Cert.;
Clinical Medicine, Prize;
Physical Society's Essay, Prize.
1860. 3rd Year Student, 2nd College Prize;
Physical Society's Prize.

SLATER (J. S.), Bath.

1868. 1st Year Student, 1st College Prize;
1869. Physical Society's 2nd Year's Prize.
1870. 3rd Year Student, 2nd College Prize;
Treasurer's Gold Medal.

SLAUGHTER (C. H.), Farningham.

1855. Midwifery, Hon. Cert.

SLAUGHTER (G. M.), Farningham.

1854. Midwifery, Hon. Cert.

SKINNER (W.), Stockton-on-Tees.

1848. Botany, Hon. Cert.;
Materia Medica, Hon. Cert.

SKIPPER (J.), Dalston, London.

1852. Midwifery, Hon. Cert.

SKIPTON (S. S.), East Indies.

1851. Midwifery, Hon. Cert.

SNAITH (F.), Boston, Lincolnshire.

1864. 3rd Year Student, Hon. Cert.

SPRAKELING (R. J.), Canterbury.

1855. Midwifery, Hon. Cert.
1856. 2nd Year Student, Hon. Cert.;
Clinical Medicine, Prize.

STADDON (J. H.), London.

1858. Clinical Medicine, Prize.
1859. Clinical Medicine, Prize.

STEPHENS (S. SANDERS), Taunton.

1863. Physical Society's 2nd Year's Prize.

STONE (W. H.),* London.

1854. Matriculation Examination — Scholar-
ship;
1st Year Student, Scholarship;
Descriptive Anatomy, Hon. Cert.;
Botany, Prize;
Chemistry, Prize.

1855. 2nd Year Student, Scholarship;

- Forensic Medicine, Prize;
Physical Society's Essay, Prize;
Practical Chemistry, Prize;
Medicine, Prize;
Descriptive Anatomy, Hon. Cert.;
Materia Medica, Prize;
Physiology, Prize;
Clinical Medicine, Mr. N. Smith's Prize.
1856. Clinical Medicine, Prize;
General Proficiency, Treasurer's Medal.

SUMMERHAYES (H.), Crewkerne, Somersetsshire.

1861. Matriculation Examination — Classics
and Mathematics, President's Prize;
Modern Languages, &c., College Prize;
Physics and Natural History, College
Prize;
The William Tite Scholarship.
1862. 2nd Year, Tite's Scholarship.
1863. 3rd Year, Tite's Scholarship, Treasurer's
Gold Medal.

SUMMERHAYES (W.), Crewkerne, Somersetsshire.

1856. Matriculation Examination — Classics
and Mathematics, Hon. Cert.;
Matriculation Examination — Modern
Languages, Prize.

SUTCLIFF (E.), Camberwell.

1861. 1st Year, 3rd College Prize;
Matriculation Examination — Hon. Cert.
1863. 3rd Year Student, 3rd Coll. Prize.

SUTCLIFFE (J.), Ashton-under-Lyne.

1869. Prosecutor's Prize.

SWALLOW (J. D.), Reading.

1861. 2nd Year Student, Hon. Cert.

SWEETING (R. B.), Reading.

1853. 1st Year Student, Scholarship;
Descriptive Anatomy, Hon. Cert.;
Chemistry, Hon. Cert.
1854. 2nd Year Student, Scholarship;
Midwifery, Prize.
1855. 3rd Year Student, Scholarship;
Midwifery, Hon. Cert.;
Clinical Medicine, Treasurer's Prize.

SWEETING (T.), Reading.

1855. Midwifery, Hon. Cert.

TALBOT (G. T.), Kidderminster.

1848. Medical Reports, Dr. Roots' Prize.

TAYLOR (C. M.), Wrawby, Brigg.

1871. 1st Year Student, 2nd Coll. Prize.
w1872. 2nd Year Student, 1st Coll. Prize.

TAYLOR (S.), Burton-on-Trent.

- w1872. 3rd Year Student, Hon. Cert.

TEANBY (F. W.), Turnham Green.

1851. Practical Midwifery, Prize.
1852. Clinical Medicine, Junior Prize;
Midwifery, Hon. Cert.

THOMAS (L. M.), Camberwell.

1866. 1st Year Student, 3rd Coll. Prize.
1867. 2nd Year Student, 3rd Coll. Prize.
1869. 3rd Year Student, 2nd Coll. Prize;
Cheselden Medal.

* Assistant Physician to, and Lecturer on
Physics and Natural Philosophy, and Joint
Lecturer on Forensic Medicine at, St. Thomas's
Hospital. Late Assistant Physician to the Hos-
pital for Consumption and Diseases of the Chest,
Brompton.

THOMAS (W. L.), Neath, Glamorgan.

1845. Chemistry, Prize;
Materia Medica, Prize.
1847. Medicine, Hon. Cert.;
Physiology and Anatomy, Prize;
Physical Society's Essay, Prize.

THOMPSON (F. H.), Tenbury.

1870. Prosecutor's Prize.

THOMSON (K.), Luton, Beds.

1843. Medicine, Prize;
Clinical Medicine, Hon. Cert.

TIMOTHY (V. P.), London.

1851. Practical Midwifery, Prize;
Midwifery, Hon. Cert.

TREND (H. G.), Bridgewater.

1853. Practical Midwifery, Prize;
Midwifery, Hon. Cert.
1854. Midwifery, Hon. Cert.;
Clinical Medicine, Treasurer's Prize.

TREVES (W. K.), Dorchester.

1863. Matriculation Examination — Physics
and Natural History, Hon. Cert.;
Modern Languages and Modern History,
College Prize and Hon. Cert.;
1st Year Student, Hon. Cert.
1865. 3rd Year Student, 2nd Coll. Prize;
Prosecutor's Prize.

TYRRELL (W.), Richmond.

1851. Descriptive Anatomy, Hon. Cert.
1852. Medicine, Hon. Cert.;
Surgery, Hon. Cert.
1853. Forensic Medicine, Hon. Cert.;
Ophthalmic Essay, Mr. Dixon's Prize.
1854. Surgical Reports, President's Prize.

VARDY (J. L.), London.

1854. Midwifery, Hon. Cert.
1855. Practical Midwifery, Prize.

WAGSTAFFE (W. W.),* Kennington.

1862. Matriculation Examination — Classics
and Mathematics, President's Prize;
Physics and Natural History, College
Prize;
Modern Languages, &c., College Prize;
1st Year Student, Treasurer's Prize.
1863. 2nd Year Student, 1st Coll. Prize.
1864. 3rd Year Student, 1st Coll. Prize!
Physical Society's 3rd Year's Prize;
Treasurer's Gold Medal.

WALLER (A.), Islington.

1861. 1st Year Student, 1st Coll. Prize.
1865. 2nd Year Student, 1st Coll. Prize.
1866. 3rd Year Student, 1st Coll. Prize;
Physical Society's 3rd Year's Prize;
Cheselden Medal;
Treasurer's Gold Medal.

WALLER (C. B.), London.

1860. 2nd Year Student, Hon. Cert.

WALKER (R.), Kendal.

1854. Descriptive Anatomy, Hon. Cert.;
Midwifery, Hon. Cert.
1855. Midwifery, Hon. Cert.

WARD (F. H.),† Searboro'.

1863. 1st Year Student, Treasurer's Prize.
1864. 2nd Year Student, 1st Coll. Prize;
Physical Society's 2nd Year's Prize.
1865. 3rd Year Student, 1st Coll. Prize;
Physical Society's 3rd Year's Prize;
Cheselden Medal;
Treasurer's Gold Medal.

WATSON (F.), Nottingham.

1859. 1st Year Student, Hon. Cert.;
Matriculation Examination — Physics,
&c., Prize.

WAY (F. W.), Fratton, Portsmouth.

1853. Descriptive Anatomy, Hon. Cert.;
Chemistry, Hon. Cert.
1854. Midwifery, Hon. Cert.;
Surgery, Hon. Cert.

WAY (J. P.), Portsmouth.

1861. 1st Year, Hon. Cert.

WEBSTER (H.), Dulwich.

1851. Matriculation Scholarship, Hon. Cert.;
Descriptive Anatomy, Hon. Cert.
1852. Botany, Hon. Cert.
1853. Midwifery, Hon. Cert.

WEST (J. F.),‡

1853. Midwifery, Hon. Cert.
1854. Forensic Medicine, Hon. Cert.;
Pathology, Hon. Cert.
1855. Ophthalmic Reports, Prize.

WHEATON (F. D. W.), Honiton.

1845. Practical Midwifery, Hon. Cert.

WILES (J.), Hitchin, Herts.

1850. Physiology, Hon. Cert.
1851. (Aécoucheur) Midwifery, Prize.

WHITEHEAD (J.), Preston.

1861. 1st Year, Hon. Cert.
1862. 2nd Year Student, 3rd College Prize.
1863. 3rd Year Student, 2nd College Prize.

WILLIAMS (H.), Longley, near Gloucester.

1868. 1st Year Student, 2nd College Prize.
1869. 2nd Year Student, 3rd College Prize.

WILLIAMS (J.), Westerleigh, Bristol.

1855. 1st Year Student, Scholarship;
Midwifery, Prize;
Botany, Prize;
Chemistry, Hon. Cert.;
Descriptive Anatomy, Prize;
Materia Medica, Hon. Cert.
1856. 2nd Year Student, Treasurer's 1st Prize.
1857. 3rd Year Student, Hon. Cert.;
General Proficiency, Treasurer's Medal.

WILLIAMS (J.), Doncaster.

1858. 1st Year Student, Hon. Cert.
1859. 2nd Year Student, Hon. Cert.;
Clinical Medicine, Prize.
1860. 3rd Year Student, Hon. Cert.

WILLIAMS (P. M. G.), Newcastle Emlyn.

1861. Practical Midwifery, Prize.

* Resident Assistant Surgeon to, and Joint Lecturer on Anatomy at, St. Thomas's Hospital. Late Assistant Demonstrator of Anatomy, and Surgical Registrar.

† Assistant Medical Officer, Wandsworth Lunatic Asylum.

‡ Surgeon to Queen's Hospital, and Professor of Clinical Surgery at Queen's College, Birmingham.

WILLIAMS (W. R.),* Nottingham.

1856. Matriculation Examination — Classics,
Mathematics, Hon. Cert.

WITHERBY (W. H.), Croydon.

1858. Matriculation Examination in Modern
Languages, Prize.

WOAKES (E.), Luton, Beds.

1856. 1st Year Student, Hon. Cert.

1857. 2nd Year Student, 2nd prize.

Clinical Medicine, Prize.

1858. Essay on Neuralgia, Mr. N. Smith's
Prize;

Surgical and Medical Anatomy, Chesel-
den Medal.

WOOD (G. J.), London.

1863. Descriptive Anatomy. Hon. Cert.

WOOD (R. H.), Loughborough, Leicester.

1854. Descriptive Anatomy, Hon. Cert.

1855. Surgery, Hon. Cert.;

Midwifery, Prize;

Medicine, Hon. Cert.;

Descriptive Anatomy, Prize;

Physiology, Hon. Cert.

1856. Physical Society's Essay, Prize.

WOODHOUSE (T. J.), London.

1855. Chemistry, Hon. Cert.;

Materia Medica, Hon. Cert.

WOOTTON (H. G.).

1855. Midwifery, Hon. Cert.

1856. Midwifery, Hon. Cert.

WRENCH (E. M.), Cornhill.

1851. Descriptive Anatomy, Hon. Cert.;

Physical Society's Essay, Treasurer's
1st Year's Prize.

1852. Physiology, Hon. Cert.

**WYMAN (W. S.), Kettering, North-
ampton.**

1852. Matriculation Examination, Scholarship.

* Resident Physician to Bethlem Royal Hos-
pital. Lecturer on Mental Diseases at St.
Thomas's Hospital.

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